



Natural Resource

November 2018 | Edition 1 | 21st Year of Publication



Mijnbouwkundige Vereniging
Study Association Applied Earth Sciences



Dear Readers,

A well informed miner, is a happy miner. That is why the Natural Resource is important and why we are proud to be part of this editorial board. To get as much miners as informed as possible, they have to enjoy reading this magazine. That is why we did our very best to make this first edition of this year as interesting and appealing as we can.

We are convinced, it makes it easier for people to read our magazine if it has articles which relate to a large number of readers and a lot of pictures. Therefore we chose to put in articles about projects currently going on, like the Delft Aardwarmte Project and the 52nd latitude line (crossing our campus). We also think that it is of great importance to the Mijnbouwkundige Vereeniging, that all of the freshmen get involved. To reach our goal of involving the new members, we dedicated a part of this issue to them and gave our freshmen an opportunity to write about their experiences. On top of that, we wanted a student with some more experience to give them some advice. Moreover, we are curious about how our fellow students, who are currently abroad, are doing. Which is the reason we chose to publish multiple stories of their experiences. Of course our new board gets a possibility to introduce themselves, in this edition; the president. This also applies to all the new committee members. We also thought people who couldn't be there, would still be interested in all smaller events which took place, so we dedicated a page to "MV news". This issue also contains an interview with a man who is mostly behind the scene, but therefore not less important; our dean. The magazine would not be complete without some thesis's and the puzzle of our valued contributor and reader, mister Weber. To make everything as appealing as possible we thought it would be a nice idea, to support all the stories by as much pictures as possible.

Then the only thing left to give you, is a very warm and sincere Glück Auf,

Daniël A. Ernste
President of the NRC





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*D*ear Readers,

I'm delighted to see a new Natural Resource, the first of our board year, has been composed and that I can address you through this presidential. First of all I wish the editorial board of the Natural Resource the best of luck with all the other editions that they will create this year. During the past months a new academic year started which also included a new year for the Mijnbouwkundige Vereeniging. At the end of August I got the honour to become the new president of the Mijnbouwkundige Vereeniging. Since then, the rest of my board and me took over the tasks of the 126th board. Actually just before the board changed we already joined the new freshmen on the first years trip, during which we gave them a brief, but intense introduction into the life of a mining student. We visited several companies after which we set course towards Belgium where we spent the nights and went underground in the mine situated in Blegny.

Barely recovered from the weekend it was already time to discover Delft during the OWee, the general introduction week of the TU Delft. Here, we showed our freshmen around and soon our freshmen were showing the rest of Delft what real partying looked like.

For us the rollercoaster of events did not stop after the OWee. While the rest of Delft enjoyed their last week of summer holiday it was time for Jeanne, Eva, Tim, Freek and me to experience the board change.

Ever since the first week of September the new academic year started we have been attending the MV room at the faculty while providing our members with enough coffee. This first period turned out to be busy as well with lots of drinks and activities. We've had our first Barbara drinks, a BBQ for PhD and master students, MV cup, BALV and many more events. We have only just started our year but we can already look back on a lot of highlights.

Now, the first period is coming to an end and that means it's time for exams for our students and a less busy period for us. However, in the weeks after it's time for new activities like the company days and the first Bachelor ceremony of the year. Also, on the 7th of December the Barbararede will take place in 'Het Noorden', which will be followed by a dinner in a restaurant in Delft. I hope to see lots of our alumni there!

I would like to conclude with a firm and harmonious,
Glück Auf!

Krijn van Alphen
President of the Mijnbouwkundige Vereeniging



127th Board Announcement



▲ From left to right: Tim Meijer, Jeanne Steijn, Krijn van Alphen, Eva Potthoff, Freek Smit

Gluck Auf!

We are proud to announce the 127th board of the Mijnbouwkundige Vereniging:

President
Secretary/Vice-president
Treasurer
Commissioner of Education
Commissioner/Warden of 'Het Noorden

C.Q. (Krijn) van Alphen
J.A. (Jeanne) Steijn
E.C. (Eva) Potthoff
T.G.A. (Tim) Meijer
F.J.J. (Freek) Smit





The Search for Battery Riches Starts Here

August 30, 2018

Sweden's archive of drilling samples is key to unlocking its potential to mine the rare metals needed for the next generation of cars. Being home to Europe's biggest rock collection has finally come in handy for Sweden amid the global race for the scarce metals that power electric cars.

<https://www.bloomberg.com/news/features/2018-08-30/miners-are-searching-for-battery-riches-in-sweden-s-rock-archive>

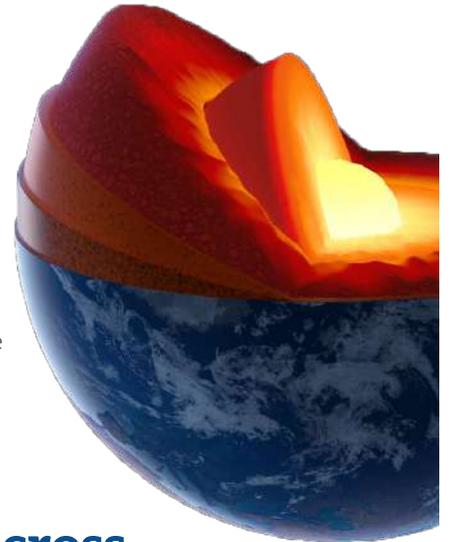
Beer threatened due to extreme drought and heat

October 15, 2018

Beer lovers could be left with a sour taste, thanks to the latest in a series of studies mapping the effects of climate change on crops.

Malted barley – a key ingredient in beer including IPAs, stouts and pilsners – is particularly sensitive to warmer temperatures and drought, both of which are likely to increase due to climate change. As a result, average global barley crop yields could drop as much as 17 percent by 2099, compared with the average yield from 1981 to 2010, under the more extreme climate change projections, researchers report October 15 in *Nature Plants*.

<https://www.sciencenews.org/article/add-beer-list-foods-threatened-climate-change>



Antarctic ice shelf 'sings' as winds whip across its surface

October 16, 2018

Winds blowing across snow dunes on Antarctica's Ross Ice Shelf cause the massive ice slab's from afar, according to new research.

<https://www.sciencedaily.com/releases/2018/10/181016150654.htm>



Tracking how rainfall morphs Earth's surface could help forecast flooding

October 2, 2018

By mapping how downpours cause Earth's crust to sag and swell, scientists may one day better forecast floods. Meteorological forecasts already reliably track where large amounts of rain fall, helping communities prepare for potential flooding. But these forecasts can't always predict where that water will go or how it will impact area waterways. Surveying crustal deformation indicates exactly where the water pooled as the hurricane passed overhead.

<https://www.sciencenews.org/article/tracking-how-rainfall-morphs-earth-surface-could-help-forecast-flooding>



Proof of the ‘Cambrian explosion’ of animal life

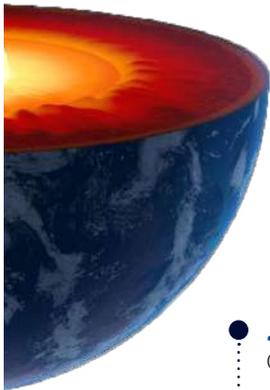
September 20, 2018

A fossilised lifeform that existed 558m years ago has been identified as the oldest known animal, according to new research.

The findings confirm that animals existed at least 20m years before the so-called Cambrian explosion of animal life, which took place about 540m years ago and saw the emergence of modern-looking animals such as snails, bivalves and arthropods.

The new fossils, of the genus Dickinsonia, are the remains of an oval-shaped lifeform and part of an ancient and enigmatic group of organisms called Ediacarans.

<https://www.theguardian.com/science/2018/sep/20/558m-year-old-fossils-identified-as-oldest-known-animal>



Alumina wake-up call for the aluminium supply chain

October 15, 2018

Alumina, which sits in the aluminium production process between bauxite and refined metal, has historically been a highly efficient link in the supply chain. It hasn't generated many headlines over the years because it has largely avoided any newsworthy disruption. It is, to quote Greg Wittbecker, analyst at the CRU research house, one of those markets "people have taken for granted".

Not any more. A series of supply hits have sent the alumina price on a rollercoaster ride this year, at one stage threatening the closure of several European aluminium smelters. This volatility poses some hard questions for aluminium producers, not least as to how alumina is priced.



<http://www.mining.com/web/alumina-wake-call-aluminium-supply-chain/>

A wrench in Earth's engine

October 1, 2018

Researchers at CU Boulder report that they may have solved a geophysical mystery, pinning down the likely cause of a phenomenon that resembles a wrench in the engine of the planet.

In a study published today in Nature Geoscience, the team explored the physics of "stagnant slabs." These geophysical oddities form when huge chunks of Earth's oceanic plates are forced deep underground at the edges of certain continental plates. The chunks sink down into the planet's interior for hundreds of miles until they suddenly—and for reasons scientists can't explain—stop like a stalled car.

<https://phys.org/news/2018-10-wrench-earth.html>



Warm tropical Atlantic waters juiced the 2017 hurricane season

September 28, 2018

Very warm waters in the tropical Atlantic Ocean were the primary cause behind the region's many strong hurricanes last year, including powerhouse storms Harvey and Maria, a new study finds. And that pattern of ocean warming is likely to become more common in the future, fueling more strong hurricanes, the researchers say.

<https://www.sciencenews.org/article/warm-tropical-atlantic-waters-juiced-2017-hurricane-season>



Schacht lunch

September 14, 2018

Every year the board of 'De Schacht', girls guild of the MV, gathers all the girls to have lunch together. The lunch is pink-themed. The main idea is to create the perfect bonding time, while eating an amazing lunch. Lots of rozekoeken and pink balloons were all around the room to make sure all the girls have a good time.

NoCo change

September 19, 2018

The 46th Noco celebrated their eventful NoCo year with a nice tall glass of beer, which they drank with shocking ease. After this refreshing drink, they went to the basement to prepare the new 47th Noco for the new year. Here the NoCo change was made official.

'Maarten Schroot in de Gracht' change

October 10, 2018

The honourable "Maarten Schroot in de Gracht penning", which is assigned to a person who commits a lot of time and effort to the Mijnbouwkundige Vereniging, was handed over from Adriaan van Natijne to Jeras Dieleman. This was done, as always, by a quick dive in the canal.

BALV

October 10, 2018

All members came together to give their input on the MV. The board policy and the committee policies were presented and approved by the member during the BALV.



MV Cup

October 16, 2018

Miners are well known for their incredible range of qualities, and this year again we have shown that playing football is definitely one of them. The players were unstoppable and battled until the very end. Afterwards energy was regained at the MV with delicious dinner.

IFF

October 17, 2018

On the 17th of October traditional IFF party took place. After pre-drinks at het Noorden all the miners headed to Lorre in order to join other four study associations for the epic night!





MEET OUR

President 2018-2019



K

RIJN IS OUR MV PRESIDENT AND OF COURSE HE HAS HIS PRESIDENTIAL HABITS WELL IN ORDER. He IS LATE MORE OFTEN THAN HE IS ON TIME, YOU CAN HARDLY SEE HIM BEHIND HIS COMPUTER. WHEN HE IS EATING CHUPA-CHUPS, HE IS PROBABLY HUNGOVER. DO WE LIKE HIS CURLY HAIR? YES, WE LIKE HIS CURLY HAIR!

A little 'chit-chat' with the President

By G. DRAGONAKIS

- **Name: Krijn van Alphen**
- **Age: 21 years old**
- **Birthplace: Breda, Netherlands**
- **Motto: The key to success is doing things you like.**

Krijn van Alphen has been appointed to the new board of the Mijnbouwkundige Vereniging. The NRC had the chance to give an interview with the new president and get a little insight of the new board through him.

Introduce yourself shortly and tell us a little story about yourself.

My name is Krijn van Alphen, I am 21 years old and 4th year Applied Earth Sciences Bachelor student at the TU Delft. I came to study Applied Earth Sciences here in Delft because it seemed as a nice and broad study, combining both technical subjects and geology. My first year was a very enjoyable one, which motivated me even more to stay here in Delft. I also had a great time with the MV, though I became part of the student association 'Sanctus Virgilius'. I still was very active through different activities with the MV, joining the NoCo in my second year and now becoming part of the board which I enjoy very much.

How do you feel for joining the MV board and eventually becoming the president?

When I was asked to become part of the board in February 2018, it sounded very exciting but I still didn't say 'Yes' immediately but after a couple of thoughts it seemed kind of cool to me so I decided to join. I wanted to become the president, which is something that worked out very well in the end.

As president of the 127th board, are you and the rest of the board focusing on creating or improving something for the association?

As a decrease in the number of students joining our study has been noticed, we want to increase the number of students that come here in Delft. We also want to preserve the amount of students that

came to Delft and joined the 'Freshmen Weekend' through motivating them, helping them with their study and inform them properly. Of course it is important that the students do like what they study. Otherwise there is no point in doing anything of the before mentioned things. Another thing is that since a lot of international students come and take part in our study, we don't want to make any kind of discrimination, thus we are focusing a lot on having one solid society including both international students as well as Dutch ones. Finally the Barbara borel will be existing for 50 years this year, which is an amazing event and we are also introducing the culture rally which hasn't been for two years.

Tell us some new activities that are 'an absolute must' for every member and of course for the new freshmen in order for them to get adapted and introduced to our wonderful mining society.

Well, all freshmen should come and join us to the 'Tiki Bad' where they can come and swim together with the board which will take place in the second period. The Wintersport will take place again this year, of course some people have signed up but we hope that even more will be willing to participate in it, but new activities will be the culture rally and the Barbara borrel that I mentioned before.

" People in Delft say that we are old fashioned by doing mining , but I think we are going to play an important role in the energy transition and energy industry "

What are your personal ambitions and priorities as the new president?

Certainly introducing the best board the MV as ever seen, to have a good time with the rest of the board, keeping our members close and include everybody in our study to make them feel comfortable and 'at home'.

Supposedly you and the rest of the members were shipwrecked at a random island. What would everybody do? What function would everybody choose?

I think the girls would stress out for a short moment but would then quickly after start enjoying the sun and the beach. Tim would immediately start to gather stuff from the surroundings and then start building a raft with it. He would also try to make sure everybody would then help him. Freek would immediately go on a conquest for drinks of course. I think I would first just sit down to overthink what's the best thing to do to and afterwards try and solve the problem.

If you can provide us with an inspirational sentence to motivate our freshmen as well as every other member of the MV. What would that be?

People in Delft say that we are kind of old fashioned by doing our 'mining' things but I think we are going to play an important role in other things such as the energy transition and the energy industry for the coming decades. Those are some things that every part of our strong association should keep in mind. As for the people outside of it, they should always take in account that the broad and special skills provided by our study will always be necessary for the coming technical as well as energy challenges of the future.

Gluck Auf!



Freshmen Weekend

By J. van Dijk

The freshmen weekend started when we all gathered at PSOR, a group of 35 and nobody knew each other but a moment later everyone was talking with someone on our way to Shell in Rijswijk. At Shell they told us about the basics of drilling, a subject totally unknown for me but I found it interesting. Also they told us that safety is a priority, because the work can be dangerous for people on a drilling platform, so they told us to always use the railing of the stairs to take the workers on a drilling platform into account. In the evening there was a beer cantus, a perfect way to get to know the songs and habits of the MV. Around 12 we were all laying in the sports hall and within 10 minutes everyone was asleep.

After a short night we were woken up by the noisy EPO board. I could not believe that they had so much energy and I was afraid that this was going to be a standard student week: get up early – a day full of activities – drink – sleep – repeat. That day we went to a KNMI antenna in the middle of a meadow. The man who did the tour was doing research in differences in radiation from the sun in time, which is important to predict climate change. An interesting subject but hard to understand. In the afternoon we went to the Zuidas in Amsterdam, for the engineering firm 'Witteveen+Bos'. They had a brand new office and a scale model of the Zuidas and they were working on the preparations for the big transformation that the Zuidas is undergoing. We learned that for the highest efficiency a lot needed to be taken into account, traffic for example. We had seen three different places where a mining engineer

could work and now the fun started, on our way to Belgium! A lot of golden records were listened in the bus and everyone had met multiple MV'ers to be, board members and the EPO's. The atmosphere in the bus was energetic and the fun continued until midnight. We wrote an amazing year song and the floor and toilets were disgusting, signs of a successful party.

“I did not know that you could get to know so many people in the MV in such a short time, and learn so much by having fun.”

The next day, we woke up early again, but for a good reason: we were going to Blegny, the highlight of the excursion. We went into the old coalmine which was impressive and afterwards we had the 'mijndoop'. We go to know all the committees and after that we went into the minecart. The day after we went to the Ardennes for a geologic walk. We learned that you had to watch very carefully to understand the deformation of the layers. We used our Estwing for the first time which felt great! Afterwards we went back to Delft and had another amazing party: the OWee introduction party. The whole weekend actually was one big party. I did not know that you could get to know so many people and the MV in such a short time, and learn so much by having fun.





OWee

By M. Visser

Coming back to Delft from the freshmen weekend after a two-hour bus drive, we were dirty and tired. But the official opening had only just begun! The OWee or the 'openingsweek', started with registration in the morning. Smelling like dirt and looking as though we hadn't showered nor slept in days, we collected our wristbands for the week. The OWee started off with a BBQ, so we went to drop off our stuff at our Sleep-Inn houses.

The Sleep-Inn house I would be staying at was the Jacoba van Beierenlaan (JVB). Arriving at JVB, I was welcomed heartedly and there was even a made-up bed for me!

Sunday night we had the Kick-off Party, which was lots of fun! A large part of the group already knew each other, having been to the freshmen weekend. People who hadn't been, joined in quickly, forming a cosy group of miners. Of course, we all got coal smeared across our faces, so we were easily recognised and felt connected to each other. The party lasted till late at night and we went home, feeling ecstatic from either alcohol or joy, presumably a little of both.

The rest of the week you could do as you pleased. Monday started with the official welcome, where we got our backpack full of gadgets and a shirt. We had dinner at Virgiel and one of our fellow miners celebrated his birthday on Tuesday. It was a lovely way of closing the day. On Tuesday we had Student Association Day, so we visited them and, though a little tired, we still had a blast. In the evening, we went to DSC for more parties and fun!

On Wednesday we had Sports Day. We got to try a lot of sports and I enjoyed it quite a lot. In the evening, we got to get our first experience in 'Het Noorden'. It was phenomenal! We knew this café would be our home café and there was a marvellous ambience. Unfortunately, we had to leave at midnight because we weren't officially members yet. After that we went to a foam party at Sint Jansbrug, where I got absolutely soaked, and eventually joined another party at DSB. The night was, again, surprising and awesome.

Thursday was the last day of the OWee. In the morning, we helped set the record for eating the biggest amount of vegan kebab. It was quite tasty, though I wouldn't necessarily recommend it as breakfast. Anyhow, it was incredible and I would recommend anyone to do it. I loved experiencing it and would like to thank you everyone who made it as brilliant as it was!



Studying in Delft

By M. Markus

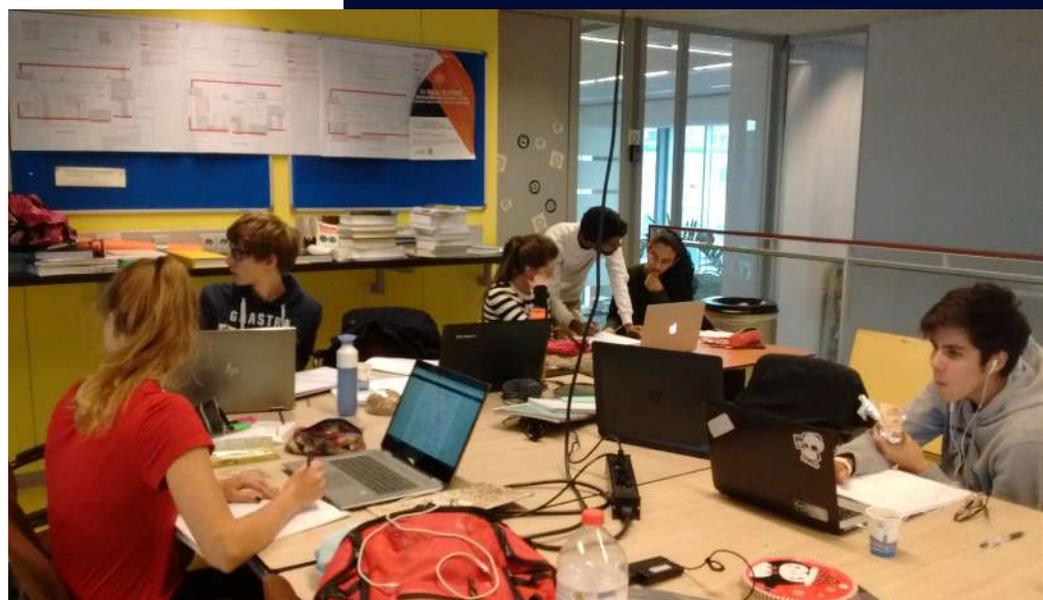
Right from the start we met the committees from the study association of Applied Earth Sciences and they were already very passionate about their causes and events. It immediately gave us a glimpse of how great the atmosphere of the MV is during the first weeks, we got to experience it for ourselves. Moving to Delft hasn't been the easiest adjustment. For starters house-hunting in Delft is a nightmare. Luckily, the kind people of the newly founded MV-house let me stay while I looked for a place. Even though my time there was short, I can tell that once the house is fully renovated, it will run smoothly and be a blast to live in. Furthermore, actually starting the course and having to keep up with four subjects is not an easy feat. Especially since two of them are newly added to our year, this definitely keeps us on our toes. A way to not be overwhelmed is by studying together, to help each other understand all the new material we're given, or trying to calm each other when Sowiso won't accept our correct answers. Luckily, we have each other at the MV table after lectures.

“A way to not to be overwhelmed is by studying together, to help each other understand all the new material we're given.”

We can also ask our wonderful board when we don't understand something or pass by for a lollipop. They are always there for us, especially in the mornings when we all queue up to get our daily doses of caffeine. Even the older year students are there for us; to help us with any problems we have and to give us tips. Especially our mentors are a big help; to guide us and give the ins and outs that we need to know.

After a long half week, we got to relax at 'Het Noorden', where the internationals understand the true meaning of 'gezellig'. Even with all the formal attire, people do unwind and we get to see people drink an unhealthy amount of beer. Which was also a rumour that we had to do for the inauguration. While it was rather exhausting and our knees did hurt by the end, it made the snacks that were served after midnight even better after we earned our ties and are official members of the MV.

All in all, this course is quite the experience and especially the people related to it are the best thing about it.



Inauguration

By L. Pikulic

Getting to know everybody was a challenge. We polished coins, got blasted with flour, danced to improvised songs (while being sober, mind you), had to know names and history by heart. If you were a loud-mouth, you got to do it all over again. I was on the NoCo hitlist as "Charmander", which meant I had to rush over to light people's cigarettes that night whenever I was called upon. Since zeros have to stay close to the ground and crawl under tables and chairs, you can imagine what that looked like. It was a lot of fun, and finally earning that tie and walking into Het Noorden as an inaugurated member felt great. Not to mention getting your hands on beer, at last.

P.S. My personal compliments go out to Sam for his exquisitely brewed NoCo-drink this year. Glück auf!



Tips and Tricks for Freshmen



By F. van der Drift

Hey everyone! My name is Frode and I'm a third year student at AES. When I started as a freshman a few years back, my only goal was to get really good grades and I wanted to constantly study. It did work, because I averaged an 8.5 during the first period of the first year. However, I quickly found out that university was much more than just studying. It was also about meeting new people, participating in events and just having fun in general. I started going to het Noorden and hanging out with people more often than I usually did.

“However, I quickly found out that university was much more than just studying. It was also about meeting new people, participating in events and just having fun in general.”

First, I didn't know how to combine this newly found social life and studying. I started skipping classes and I fell behind on most of the homework. Because of this, I failed most of my exams during the second period and I wasn't sure if I would even get my BSA. The period afterwards, I set my priorities straight: getting my BSA was the top priority and the social life came in second. I earned 25 points during the third period, which meant that I got my BSA. I went on the BSA event, we went to the Efteling. It was one of the best days of the year. The last period of the first year was definitely not the easiest period. I already had my BSA and summer vacation was around the corner, so staying focussed was hard. It didn't help that one of the most difficult courses was given during that period. Still, I passed most of my exams.



All in all, I don't regret much of what I did as a freshman. I did get my BSA pretty easily and I made sure to enjoy my time at university. Attending the events that were set up by the MV really helped with that. I made some really good friends at the MV and they are part of the reason why I wanted to stay at the MV. I also went on the second year excursion last year. This excursion was really, really helpful and I'd definitely recommend going to this event once you are in your second year!

I do have some more advice for the first year students.

Don't skip classes! It will save you so much time if you go to every lecture and pay attention, because you don't have to learn everything by yourself. Physical activity also is key, because you will have a lot more energy if you live a healthy life, which helps when studying. My last piece of advice is to occasionally switch from study place. It helps me concentrate better when I have to study for a long time.

To wrap everything up, I just want to say: make sure to enjoy your time as a student. Even though passing exams is important, it should not be the only thing you're focussing on!"

Glück Auf!





Yearbook

The dark blue, occasionally light blue, cover of the MV Yearbook will always have, we hope, a special place in a miners bookshelf. Thus, the 79th Editorial Board of the Yearbook has already been busy working on the 79th edition since June, and we are looking forward to fill the book with interesting articles, updates about last year's MV activities, in general, a look back at the year 2016/2017 - 2017/2018, and what was achieved and experienced in a range of subjects. As the years before, we think it is important to think ahead and focus on solving today's issues, as well as preparing for the future. After all, engineers are everyday heroes. We are looking forward to the end result next year!

Glück Auf!
Yearbook Committee '18-'19



▲ Barry Versluis, Juliette Bruining, Julia Rudlang, Stijn de Graaf and Krijn van Alphen (QQ)



▲ Jens van der Knijff, Lauran de Jong, Daan van Nie, John Koes and Faris Brough

SpoCo

We are an elite team of athletes who have backgrounds in a vast array of sports. Our job as the new sports committee is to make sure that there are plentiful sports events and opportunities for the MV community to take part in. Our team consists of Jens, Faris, John, Daan, Lauran and our QQ Jeanne and we have dedicated ourselves to ensuring this. We hope to see you at our next event!

Glück Auf!
SpoCo '18-'19

GOC

Borrels, parties, BBQ's, trips; the life of a miner is filled with activities. And no matter what, GOC is always represented! Do you feel like a part of the night might be erased from your memories? Does a sensation of discomfort approach you when you walk around at the faculty and catch some judgy gazes? Big chance that your mind is trying to protect your self-confidence against occurrences during the darkest hours of the night before. Don't you worry, we have all been there.

Of course it is comforting to know what actually happened. That is what we are for! Come to us and we will show and tell you all about how you attacked the cleanness of your innocent soul. Do you want to confront yourself with your own deeds without spectators around? As soon as our hangover is overcome, the pictures appear at MijnMV.

Even though we are the eyes and ears of the MV this year, we cannot notice everything. Are you in possession of evidence or did you witness something peculiar concerning a fellow miner, we would love you to enlighten us with some detailed information. All for the greater good of course.

We are the GOC, Geheugen Ondersteunende Commissie. Let's make this year unforgettable!

Glück Auf!
GOC '18-'19



▲ Carlos Velasco, Javier Mozas Maradiaga, Isa van Tuyll, Hanneke Tiktak and Annabel Rijsenbrij

External Committee

The External Committee is the newest committee within the MV. We will do the acquisition for the MV, so that you all can join the activities, trips and excursions for a small price and you can read this magazine and the yearbook for free.

Apart from that, we will be there to improve the collaboration between you and your future employees. The Company Days in December, an epic company diner in the spring and a Linked-In/resume course will improve these relationships.

All in all, we will make sure that you can have fun during your time with the MV, but also after your bachelor or masters.

Glück Auf!
External Committee '18-'19



▲ Frederieke Tutuarima, Goof Blokker, Krijn van Alphen and Jakob Damen



▲ Alonso Ocampo, Samuel Colijn, Freek Smit (QQ), William Horeman, Berend Bouvy, Ewald Obbens, Max Hertogs and Jelle Prins

PromoCo

We are the Promotion commission (PromoCo) consisting of 5 team members; Beatrice, Alex, Lucia, Noor and Hein. The overall goal of promoco is to advertise and inform other people what our study is all about with the hope of getting a greater number of admissions for the coming years. We do this through different events such as open days, school visits, workshops for visiting schools and assisting students for a day.

Glück Auf!
PromoCo '18-'19

NoCo

Too many assignments? Stressed? Tired? If this feeling invades you every week, we have a very attractive solution for you. The 47th NoCo invites you to get a couple of beers at the best bar in Delft: Het Noorden. Our distinguished, guinea-pig eating committee, consisting of master Freek, Jelle, Berend, Alonso, William, Sam, Ewald and Max will make sure that the taps run at their full capacity to ensure a fantastic Noorden night. Moreover, Du Nord offers its miners more beer for less money. A happy miner is a drunk miner and this is an offer you just can not reject. Boots, Lenins, Ketel 1, Tramlijn 1, Yards, you name it. Het Noorden has everything to make you, fellow miner, be ready for another long day at uni.

Come join the Noorden Committee every wednesday to have a night that, despite the efforts from the GOC, you probably won't remember. GA

Glück Auf!
NoCo '18-'19



▲ Alexander Essle, Eva Potthoff (QQ), Beatrice Ejlal Moghari, Lucia Alconchel Ibarrola, Hein Lafeber and Noor van Eimeren

NRC

The editorial board of the wonderful magazine currently in front of you, made to keep you posted on every Applied Earth Sciences related detail, consists this year of Jolijn Hiemstra, Karla Echeverry Caro, Katarina Kovacevic, Gerardos Drakonakis, Daniel Ernste and our qualitate qua, Jeanne Steijn. Together we will make sure you are not disappointed when you finally receive the Natural Resource after a long lasting period of waiting. We do this by providing you with interviews with interesting people from within and without our bachelor and master program and with coverages of all the activities of the Mijnbouwkundige Vereniging.

We feel honoured with this amazing task and we hope you will be reading the Natural Resource with pleasure.

Glück Auf!
NRC '18-'19



▲ Gerardos Drakonakis, Jolijn Hiemstra, Karla Echeverry-Caro, Katarina Kovacevic and Daniel Ernste



▲ Matthijs Bölger, Thijs van Wieren, Floris Vis, Dorus Vlierboom and Freek Smit (QQ)

StuCo

The StuCo is the Studytrip Committee. Floris Vis, Matthijs Bölger, Dorus Vlierboom & Thijs van Wieren we form the 4th StuCo. Organizing the Studytrip for 3rd year Bachelor student or higher, we will choose a location and do as many activities as possible related to the different mastertracks. With this trip we hope we can help students get a better idea of what they want to do after their bachelor.

Besides the main goal, being serious, the Studytrip will be a lot of fun with a great group of students.

Are you a 3rd year or older bachelor student? Then you are the lucky one who is able to join this awesome trip!

Glück Auf!
StuCo '18-'19

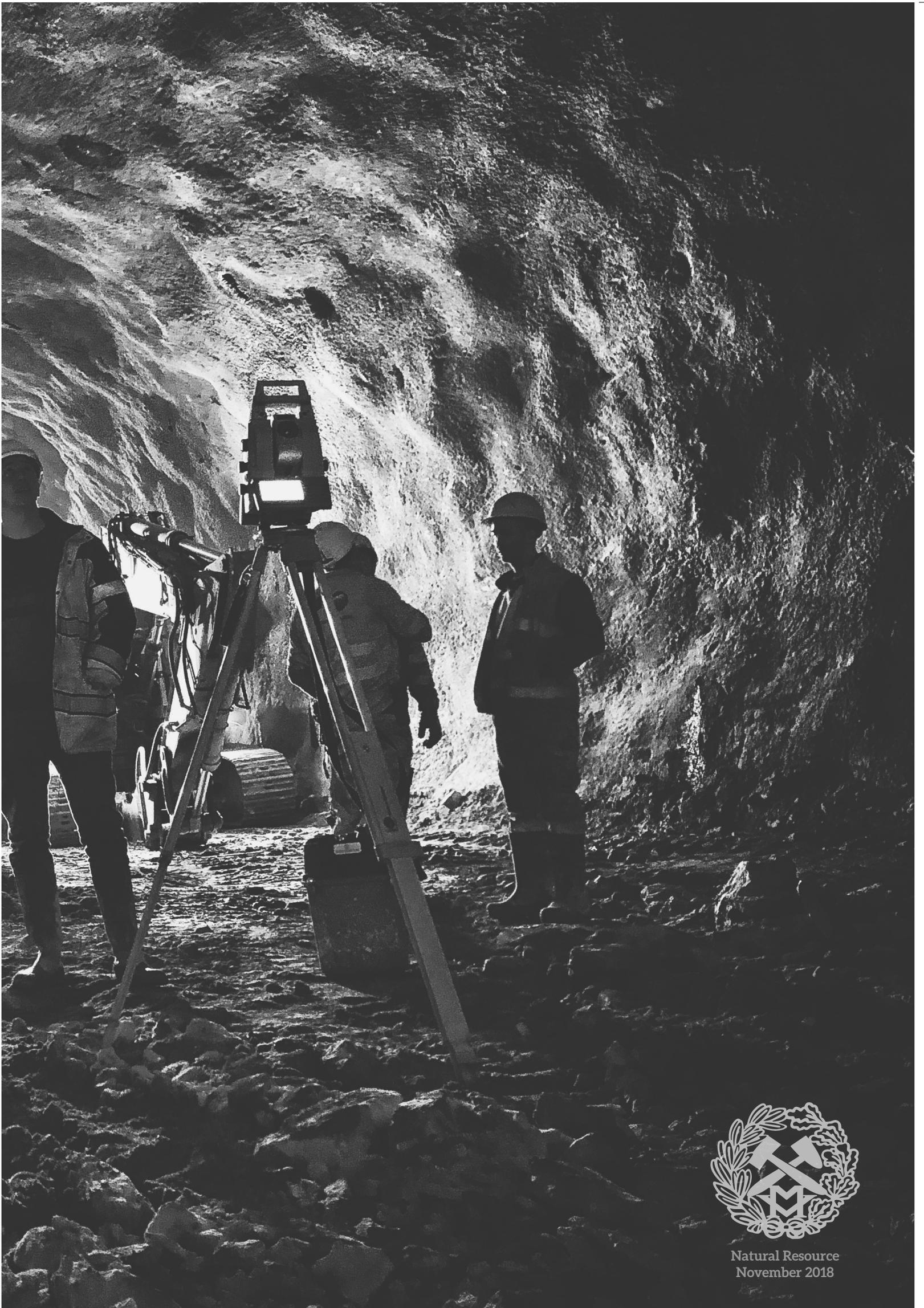
SjaCo

Ever been to a completely new city, without any friends nor orientation? This is the case for most first years students, both international and Dutch! It can be a tough situation to find yourself in, so SjaCo made up of only freshmen (Sharodj, Esther, Thierry and Anna) was built around the idea of uniting the 2018 first year class, providing the traditional year's sweaters for everyone and possibly organizing fun activities outside the faculty for a nice break!

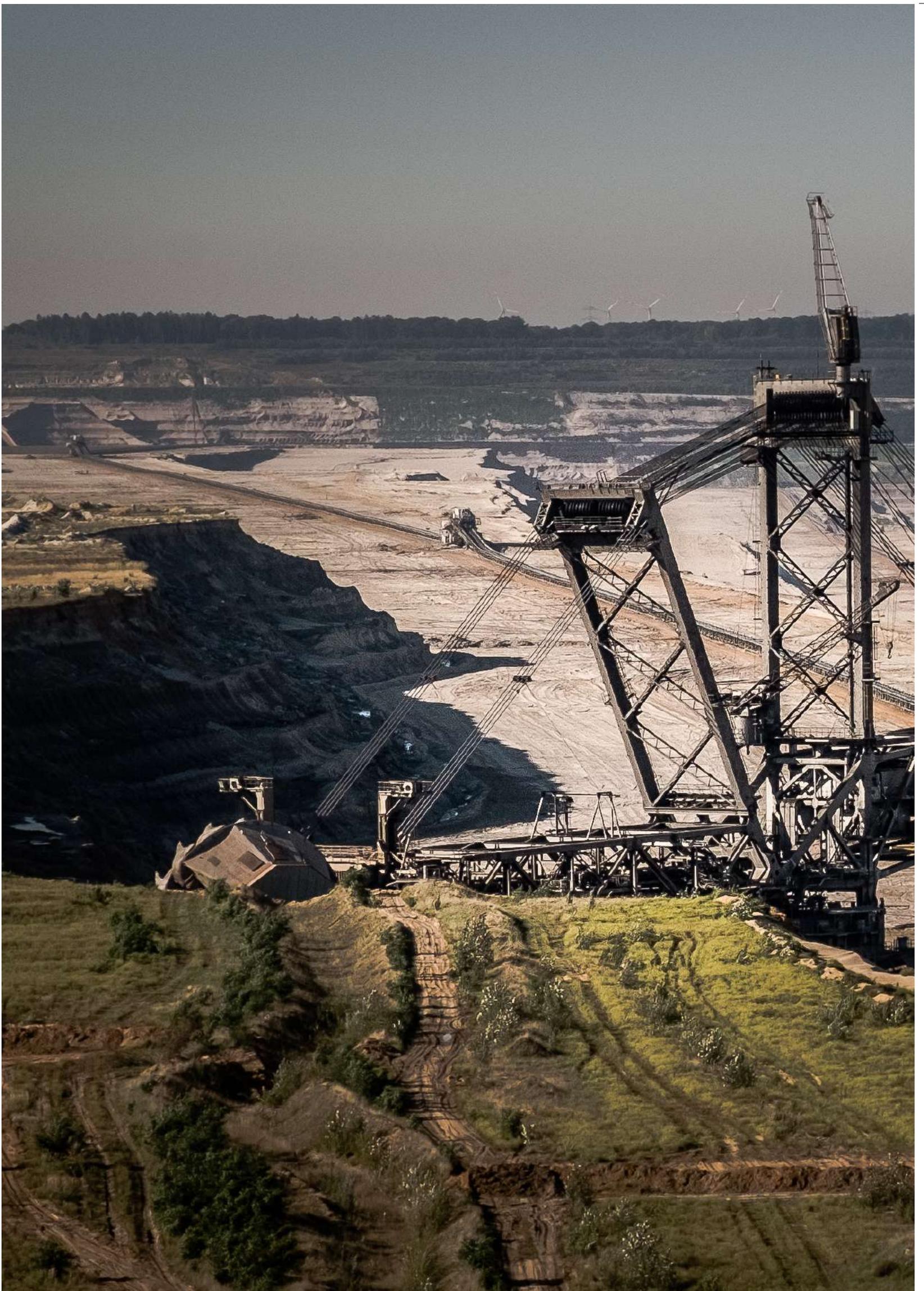
Glück Auf!
SjaCo '18-'19

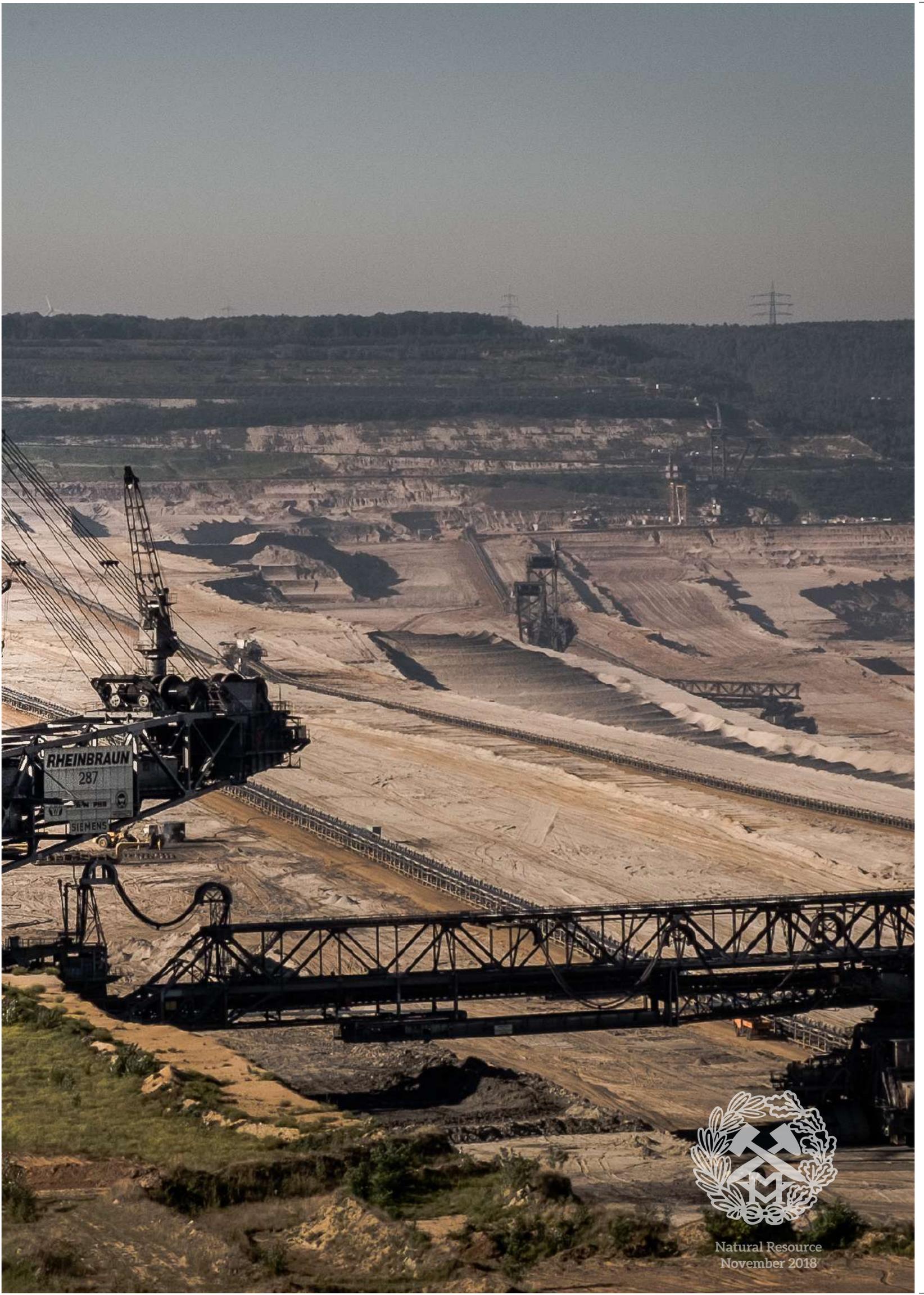


▲ Top: Eva Potthoff (QQ), Jeanne Steijn (QQ)
▲ Bottom: Sharodj Mahabier, Anna Gatti, Esther Zijlstra and Thierry Hopman

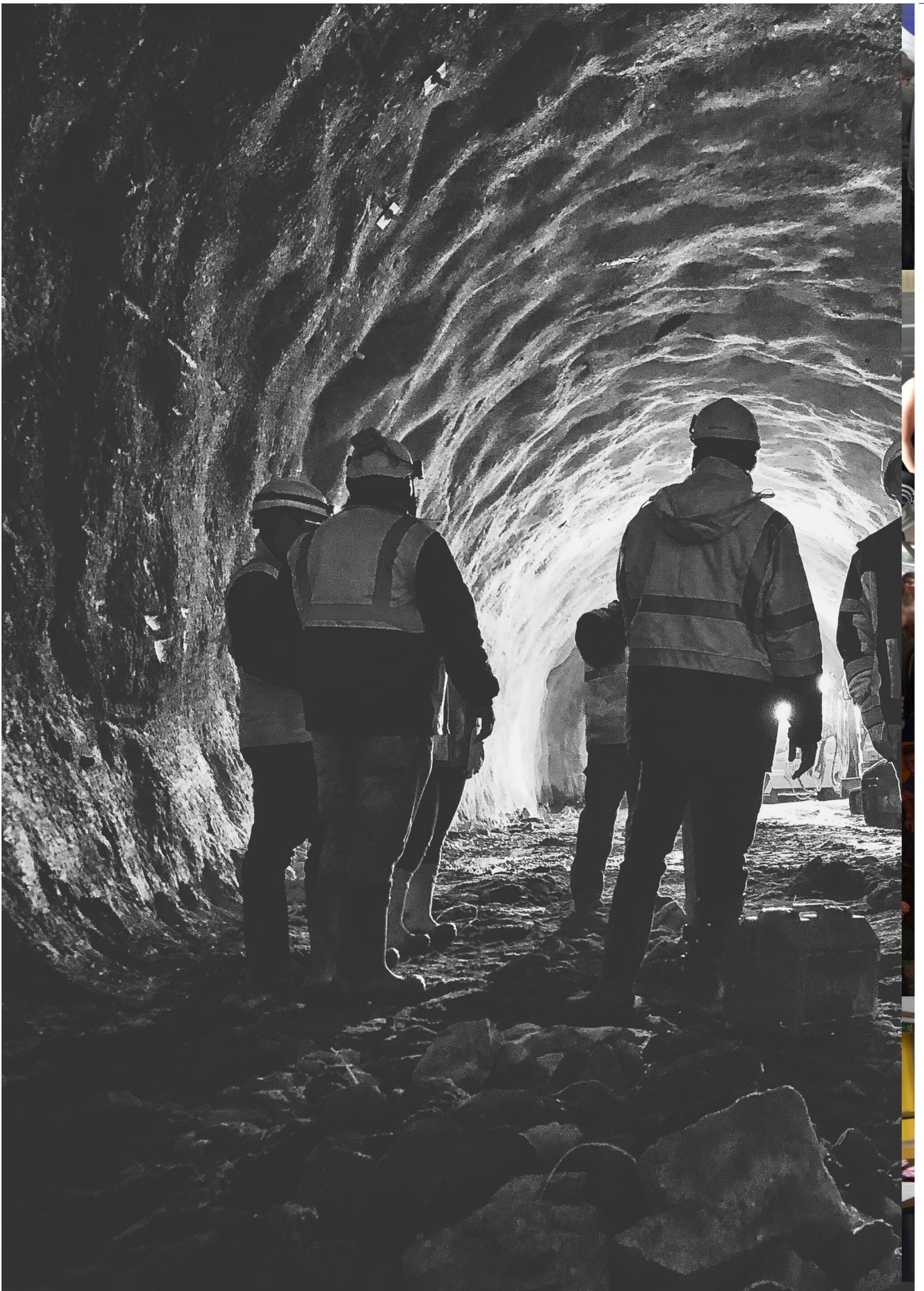


Natural Resource
November 2018





Natural Resource
November 2018







By G. Drakonakis

NRC had a small interview with our new dean; Jan Dirk Jansen.

What is your field of expertise?

My official title is Professor of Reservoir Systems and Control, which is about the use of systems and control theory in order to influence subsurface flow of oil gas, nowadays also hot water and CO₂. It is largely about numerical simulation and optimization of tools to influence subsurface reservoir activity.

How long have you been working at the TU Delft?

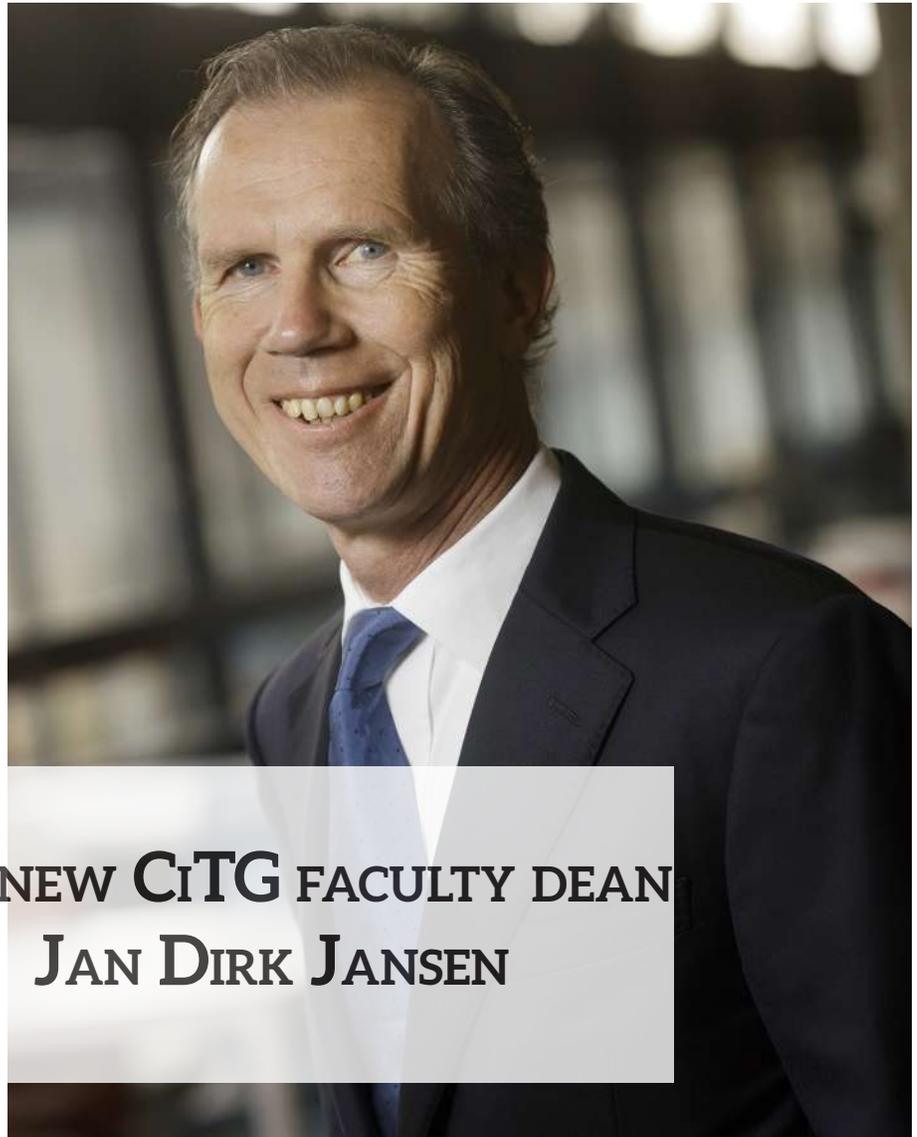
I started in 1999 with a part time position. I was working half of my time at Shell and the other half at the university as an assistant professor where I became associate professor in 2002 and full professor in 2005. Eventually, I started to spend more time at the university till 2010 when I started to work here full-time.

Are you participating in any interesting research projects this period? If yes would you like to explain it briefly?

Since I was appointed dean of the faculty, my time participating in research has strongly been reduced, however I am still involved in two very exciting fields. One of them is geothermal energy. You are no doubt aware that we are trying to drill a doublet (two-well system) here on campus. We have launched a research programme related to that. I am working on several proposals for research and in the background I am trying to help realize the well. The other field that I am increasingly interested in is induced seismicity. We should with no doubt be aware the induced earthquakes in the province of Groningen, where I worked on a major proposal and I am currently working with several students on papers related to the effect of natural gas production on earthquakes.

What do you think is the key to developing a strong research team?

Good people are generally the key. Obviously important things are the topic,



THE NEW CiTG FACULTY DEAN JAN DIRK JANSEN

the feeling amongst everyone and a little bit of luck but the most important 'ingredient' is the people.

Here at the TU Delft, students are constantly promoted to become independent thinkers but at the same time being capable to cooperate with a variety of people of different fields. According to your experience, how can someone combine those two aspects?

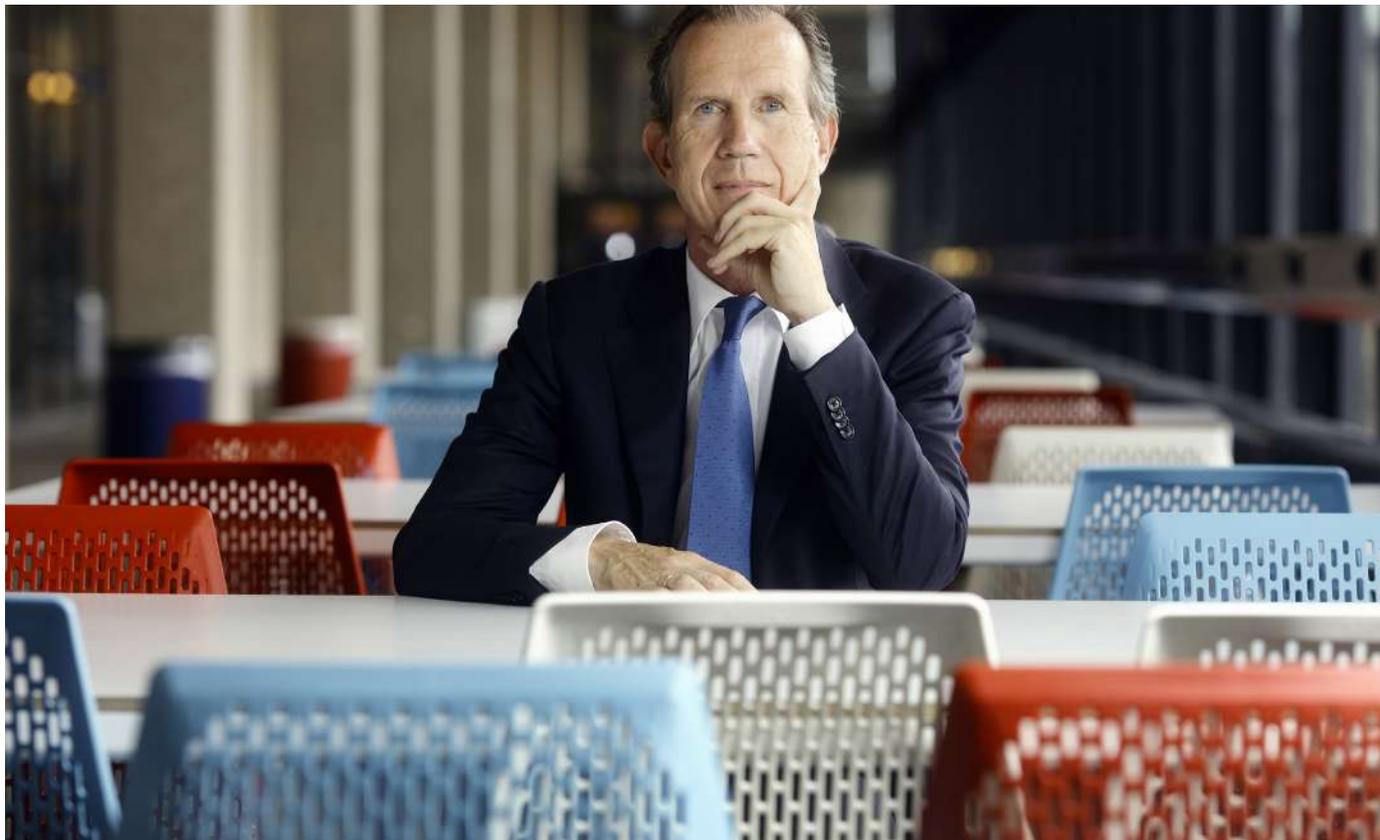
Well those two things certainly go together because cooperating doesn't mean that you need to start thinking like others and you always have teams with different opinions and different ideas. One of the dangers of working in groups is when you start to think like each other and start to lose yourself in group-thinking. Obviously, you need some social skills and you need to compromise at certain moments, be a team player and enjoy having your ideas

challenged by others. Challenge other people's ideas, do that in such a way that you build some type of understanding on what you are working on.

Would you like to share a time when you willingly took additional responsibilities during a certain project and how you successfully managed to meet all the requirements for those responsibilities?

Well there are moments when you constantly need to keep a lot of balls in the air. For example during student times when you always think you are working on one topic, like an assignment or a topic or even being an editor of natural resource. In the background you are already preparing for real life where many duties need to be combined and it's a matter of common sense, being a team and cooperating with people around you. Don't try to do everything yourself but do the essential things for yourself.

JAN DIRK JANSEN



As you stated before you were recently promoted as Dean of the faculty and you said that it had an effect in your time as a researcher but also as teacher. Would you like to shortly explain that?

Well the road of the Dean is to a large extent a managerial role so apart from guiding the overall research and teaching direction of the faculty you take up a managerial role. Examples of this are human resources and finance. Also, rather than looking over one department you suddenly start looking over seven departments and many of them are involved in activities I am not very familiar with. There is also the external representation such as meetings to represent the faculty and preserve and increase our reputation as well as our activities all around the world.

How does it feel to have experienced and still experience parts of the history of the TU Delft?

Well, it is a fantastic university to work for with a great history behind it and the interesting thing is that I studied Civil Engineering then I did my PhD in Mechanical Engineering and eventually I joined Shell where I had a career in Earth Sciences, subsurface engineering,

first drilling and production and then deep surface reservoir engineering and reservoir simulation. Now of course the circle is closed because I am back to Civil Engineering although I went into a slight different level of detail than I used to be.

As a student what were or still are the things that you appreciate and admire about our university?

The level of research combined with a great connection to the world. We are very few people that are locked up in an 'ivory tower' which have a desire to have an impact in society and at the same time we are increasing in high scientific level. We also have great students who develop themselves not only on the technical side but also at a much broader spectrum, which is a great thing. The working atmosphere in our faculty is great, I see a lot of talented staff and a lot of talented students.

What are the biggest differences that you observe in the university today in comparison to when you used to study here?

The environment has become more international, even the fact that this interview is taking place in English is something that wouldn't have happened back then. Fortunately we see more

women but also the demand of science has increased. We see a larger number of PhD students for example: the faculty of Geoscience and engineering where right now we have 85 PhD students whereas back in the days there were approximately 5 PhD students at the faculty. The same thing holds for Civil Engineering where there are hundreds of PhD students right now which were way less in the past.

If you could give a piece of advice to someone that wants to study engineering regardless of it being civil or Geoscience and Engineering, what would that be?

Go for the depth. Your period in the university is a time where you can spend your time to explore yourself. You may think at first that you are not capable of taking that challenge. Digging into differential equations and physics is something that really requires a lot of time but at the same time be capable to look beyond the equations and the physics. Grasp your chance to dive into something very seriously and especially during your final thesis. Prove yourself that you can do it. The topic doesn't really matter, choose something where your heart is as long as you are for it. Also, the master trajectory you choose not necessarily means that you will spend your whole life on it.



Delft Aardwarmte Project (DAP)



Name: Anna-Martine Dortland
Age: 22 years old
Master Track: Petroleum Engineering
Position: Secretary
Project: Delft Aardwarmte Project (DAP)

By G. Drakonakis

My name is Anna-Martine Dortland, I am the secretary of the board of DAP. We are a team of four people, two students and two people from industry. Students of the board change every two years and our main goal is to keep contact with companies and acquisitions as well as organizing events

What does DAP stand for?

DAP stands for Delft Aardwarmte project, which translates into Delft Geothermal project.

How did the stichting DAP start? What was the motivation for it?

The original idea started at Café Het Noorden, while enjoying a few drinks. It was an idea of students that thought that a well on campus would be 'cool' and after little research they found out that an oil well was not very realistic and then changed their minds to make a geothermal well which represents something new with a new vision. At the beginning it was quite a broad idea from students but after contacting the university and several companies the new project slowly 'came to life'.

What is the basic concept of the DAP?

DAP is now Stichting DAP, which has the objective to support geothermal energy here on the faculty/campus but also in the Netherlands. For example student trips are organised, such as a geothermal study trip to Pisa and a geothermal professor was hired with the money raised via DAP. At the

moment, after a successful fundraising campaign, a new academic position in geothermal energy has been created and is currently being advertised. The university is proposing to build the geothermal well DAP proposed, its name will be DAPwell to recognise the contribution of Stichting DAP.

Is the project only for PhD and MSc students or can BSc students also participate in it?

Stichting DAP is for all students. However, the field trip is only for MSc and PhD students due to the limited number of students which can attend. Every three months a 'get-together' is organised where interested students can join to learn more about geothermal energy and the activities related to it here on campus. Also a symposium is organized every two years where every student can attend. The next symposium will be in March next year.

If someone would like to participate in it or even learn more about it (e.g. an internship) what would the procedure look like?

You can write your BSc or MSc thesis on geothermal energy, then you can contact professor David Bruhn or Phil Vardon). If you are interested in an

internship you can contact stichting DAP, we could bring you in contact with companies. Another option is to keep an eye on the platform 'Geothermie' which has a lot of events published to it.

What science disciplines does the project concern the most?

Mainly reservoir engineering, a lot of geological factors and of course a bit of petroleum engineering but also a major factor is economics and planning due to the fact that it is a very new industry. Problems related to that are 'How can the produced heat be used in buildings' and 'At what temperature' which indicate the technical management part of the project.

What have the greatest challenges so far and what challenge are you facing right now?

The greatest challenges until now were getting companies to participate in it and get financing for the well. Now the university is taking the lead here, where research and education are at the heart of the proposed well. Stichting DAP is focusing on projects and connecting students with geothermal initiatives.

Is the DAPwell project also focusing on providing energy to the city of Delft or is it solely focusing on providing the campus with energy?

The original idea was focusing on the campus but because additional heat can be produced there are some ideas to provide energy to student houses and to areas of the city. This will form a later phase in the project after the well has been drilled and we know exactly how much heat can be produced.

What has been your best personal experience so far?

I personally joined the study trip to Pisa which I fully recommend because there you can observe how heat is produced used in industry and at the island of Elba it is a good representation of the geology related to geothermal activity.

If someone would like to participate in the project what would your personal advice be.

Well its hard to participate directly in the execution of the DAPwell project as this is being done by staff from the university. However, there are many opportunities in participating with a BSc or MSc thesis project and there are a lot of events related to geothermal which I strongly recommend to participate in.



52ND LATITUDE

By C. van Uffelen for Delta & D. Ernste



On the 25th of October, Ramon Hansen, Bas Vollebregt, Jan Dirk Jansen, Tim van der Hagen and a lot of volunteers opened the line in a festive way. They did this by standing on the line and together they moved as the latitude line moves over time.

If you travel far enough north, sooner or later, you will reach the polar circle. A sign sometimes announces your arrival, like in the Finnish city of Rovaniemi, but you're probably not always aware of crossing such an imaginary line. Everyone has heard of other geodetic latitudes like the equator and the tropics, but did you know there is also one running straight across campus: the 52nd degree of latitude?

When Professor Ramon Hanssen realised this years ago, he came up with the idea of making it visible. After all, results in his professional field of geodesy – which, for Hanssen, involves plenty of earth observation – are often not as tangible. In November 2011, Hanssen and some

companions furtively sprayed the line on the pavement. He pitched the idea for a proper design to the Executive Board and the Deans of the faculties of Civil Engineering and Geosciences and Industrial Design Engineering.

The funny thing about this degree of latitude, says Hanssen, is that it has a time effect. This is because the Eurasian continent is moving towards the northeast. “So you see the line ‘drop’. The line used to be elsewhere, which means we can make the factor of time visible on campus. Calculations have revealed that the continent moves 16 millimetres northwards every year.”



▲ Ramon Hansen opening the line



By S. Crivellari

“Thinking about Hong Kong as your Exchange Minor destination? DO IT!”

Last February I was told that I will have the opportunity to spend the first 5 months of my third year in Hong Kong, I couldn't believe it. I had been in HK before so I had an idea already of what was waiting for me, but I could never imagine how incredible this city really is.

From the moment I stepped out of the plane: nightlife, beaches, great food, big city life, historical sites, hills, sea, tropical climate. All of this overwhelmed me the moment I started living in the city.

Life at PolyU

I'm staying at the Polytechnic University of Hong Kong and everything is great so far. Exchange students can sleep in the Uni dorms, which are 15 min from the campus; It's a really good deal since it's really cheap and super centrally located in HK (the best location compared to other universities). Also, it's nice to live together with other exchange students, most of which you get to know in a few days.

The campus is modern and well organized, with a lot of facilities like 2 swimming pool, 3 gyms, football court, tennis court and basketball court. Between lectures I love to go for a swim, hit the gym or go play football.



Hiking in the hills

One of the best activities you can do in Hong Kong (beside the “hard studying”) is hiking. In the weekends we gather up some friends and choose one of the many hikes in HK. Most of them end at the beach, where you can swim and relax with a beer. The best way to end a day!

Food & Bars

Food lovers won't be disappointed in HK. I can choose between every kind of restaurant, from the 3 Michelin stars to the 30HK\$ (3 euros) Dim Sum (typical Chinese food) restaurant. The students here rarely cook at the dorms since the kitchen facility is not very furnished and the supermarkets are pretty expensive. So around 7 p.m. the google research for a good restaurant near the halls starts and, after a big plate of stir-fried noodles, a big cold beer in a bar close-by is almost never missing! (..usually more than one on Wednesdays and Fridays).



Nightlife

Probably the coolest thing you can do in HK is going out. On HK Island a lot of bars and clubs of every kind are hidden between the skyscrapers. In a couple weeks I met lots of new people and discovered new bars and clubs every night. On nights out is easy to meet a lot of students from other universities (HKU, City University). If you met them on a weekend you will probably see them again the next Wednesday in wan chai, another good place to hang out, a place where hundreds of students usually gather up after they had a beer and maybe lost a couple dollars on a horse in Happy Valley. Here the Horse Race is the main event, every Wednesday, 10 horse races are held in a big and fancy Hippodrome where all kinds of people enjoy their drinks and place some bets. I must to admit it is really AMAZING !



These first months have been amazing and I'm looking forward for what's coming: Halloween, Christmas, New year's Eve! So second year student. If you're thinking about going abroad next year, choose Hong Kong. YOU WON'T REGRET IT!!!!

CHEERS



By S. Dehout

Dear miners,

Greetings from Vancouver! I'm Simon currently on exchange at the University of British Columbia. My time here has been insane so far! UBC as an university itself is amazing thanks its diversity of studies and people (just the campus is bigger than delft). UBC also has a crazy "Greek life" with its fraternities and sororities, parties and events which are really nice, the nicest so far was homecoming, best day drinking party so far. Speaking of partying UBC also has its own club and beach!! But the nature of Canada is beautiful too, you have to opportunity to go on beautiful hikes or go to Victoria island to surf! Very soon we will be able to go skiing in the amazing Whistler skiing area. Besides, the courses here are not too hard, just a lot of work since we have 5 courses in three months and because the majority of the grades are based on assignments and quizzes.

I would totally recommend everyone to apply to UBC for their exchange as it is one of the best places for abroad experiences.

See you in February !!

Glück auf!



.....
By S. de Graaf

“Studying abroad is something I wanted to do from the moment I started with AES.”



After a well desired summer holiday, at the 11th of September, I left to Italy to begin this amazing adventure. The thrill of a new city, different culture, new people, being able to speak basic Italian and the incredibly good food made it very easy to get myself comfortable quickly. Unfortunately, once I got there, I immediately got confronted with how (bad) the Italian system works. The enrollment stage of my study was very difficult and my accommodation got cancelled last minute. But one week of couch-surfing I found myself the very best house that can be found in Bologna. It is in the middle of the city center, very cheap, with my own room and where live with three Italian students, which is wonderful since I really hope to be able to speak it fluently once I get back.

I have been in Bologna for 4 weeks now and it has been the time of my life. The Erasmus people and activities are amazing, the food is amazing and getting used to the way of living,...that is also amazing. I have been quite a reality check to see how much better the TU Delft actually is. But since my study is so easy over here, it gives me the opportunity to do all the things I want. So I am planning trips to see the entire county together with all the new people I've met. For future Erasmus students I can highly recommend Bologna since it just is an incredible city. And if you are actually going there; feel free to contact me so I can tell you how everything has to be arranged. Since it is very very difficult and exhausting to work it out all by yourself.



By M. Spreij

“G’day mate! How’s it going?”

I’d say this is a typical greeting which I’ve finally gotten used to. I’ve been in Melbourne since the beginning of July. The day after my resit for Extraction of Resources, I flew half way across the world to Melbourne. It was quite the (long) trip, and I came to quite a surprise upon my arrival. Everyone was asking me “how I was going”. Were Aussies genuinely interested in how I was doing? I have learned that most of the times – they are!! I think they are the most laidback and kindest people I have ever met. Only recently I have learned that the most popular Aussie expression is : ‘ah, such is life’. Or basically: ‘shit happens’. How great is that?!

I’m currently living in a student apartment next to the Queen Victoria Market with 5 other girls, one of them is an Aussie. She has introduced us to some typical food such as vegemite (which I’m ashamed to say: I quite enjoy eating), lamingtons and Tim Tams (which I’m now slightly addicted to). I have really been getting in to the Australian culture and learning more and more each day. Like for instance, Aussies love their sports. In a few days we’ll have the AFL (Australian Football League, or in Aussie slang: footie) finals. I visited a footie game at the beginning of my semester which was such fun to experience, and I visited the Melbourne Darts Masters with some friends as well. This last one was particularly entertaining as I got to see legends like Raymond van Barneveld and Michael van Gerwen.

I’m also finally getting used to the “Aussie slang”. Australians like to abbreviate every single word. For instance: brekky (= breakfast), maccas (=McDonalds), arvo (=afternoon), ta (=thank you) and most importantly: barbie (=barbeque). Aussies really love their barbeques. My university for instance hosts a barbeque (or “sausage sizzle”) every week for free. This is great!

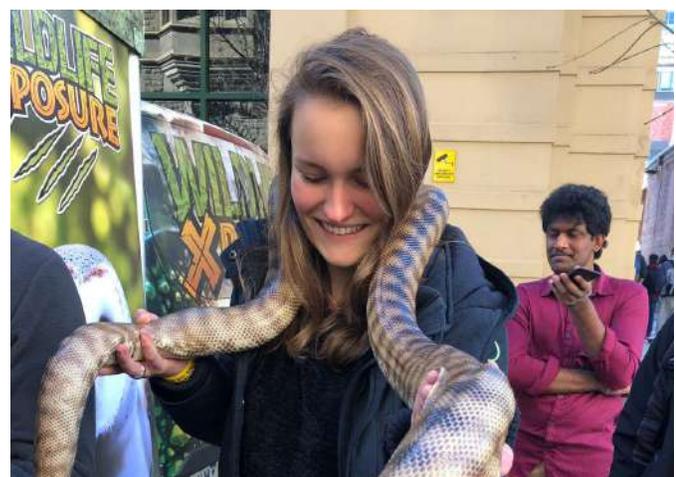
During my semester break I visited some old friends in Brisbane. When meeting up with them we were having some beers at a local bar (the most popular beer in Brissy is XXXX). Drinking XXXX in Brisbane is translated to: sucking on a mango from the brown snake (mango being the beer, the brown snake being the dirty river that flows through Brisbane). Ah, how I’ve come to love their language.

During my semester break I also had the amazing experience of visiting Australia Zoo, the legacy of crocodile hunter Steve Irwin. Here I got to feed some kangaroos and hold a koala.

I kid you not, the name of the Koala was also Marlee!! Sadly this was not a reason for the zookeepers to let me keep her or at least offer me a discount for the picture, oh well.

By the time you will receive this NR, I will have finished my semester and be on a roadtrip from Melbourne to Perth. I’m thinking about Delft a lot and missing everyone incredibly much. Australia is a beautiful country but in my time of being here I have really learned that it’s the people that make you call a place home, and for me that definitely is Delft.

Cheers





Oil and gas is our business. From Argentina to Russia we operate successful the exploration and production of hydrocarbons. In order to grow and our position as Germany's largest producer of crude oil and natural gas offering unique and challenging job opportunities such as our

We open up perspectives.

fully in
strengthen
we are

Special Professional Experts Accelerated Development (SPEAD) Program

The aim of the SPEAD program is to develop highly qualified university graduates in engineering and geoscience within our company. We offer you a tailor-made combination of "on the job training" supplemented with dedicated technical training over a 2-year period to equip you with the skills and competencies to excel in your future role within Wintershall. Essential for the SPEAD program, and for employment with Wintershall, are a Master's degree, your mobility and enthusiasm to take on demanding international positions for several years. For further information about the SPEAD program and the application process please visit our website or contact us directly:

www.wintershall.com/career

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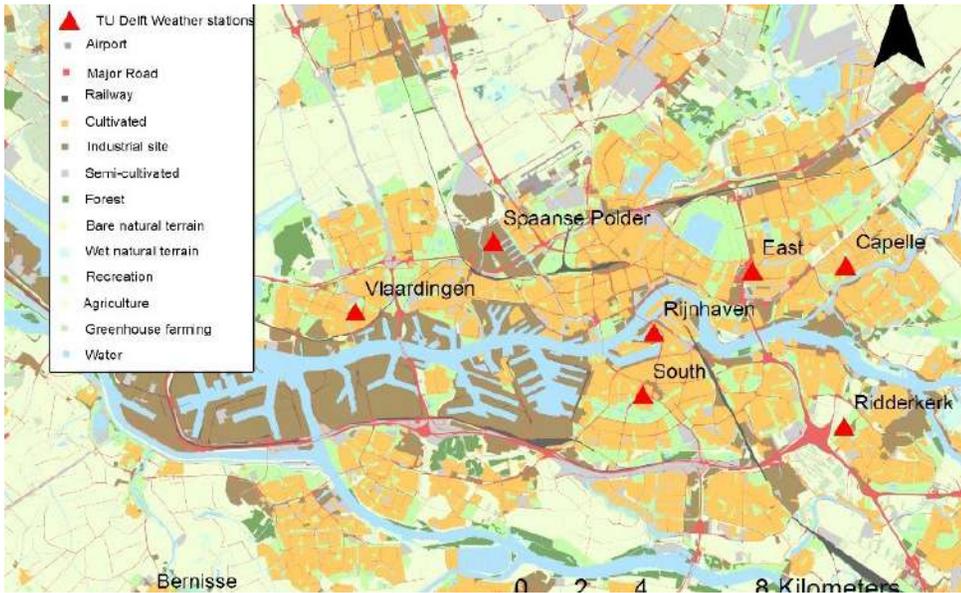


Bachelor Thesis: Urban Heat Island

By E. Blanken

Last summer, many heat records were shattered in the Netherlands, we had an (seemingly) endless summer and it got to the point that nobody could really enjoy the heat anymore. This applied to everyone, however the people within urbanized areas experienced even more discomfort due to the Urban Heat Island. The Urban Heat Island is known as an induced temperature in urbanized area with respect to their rural counterparts. You can imagine that with such a warm summer as the last one, the temperatures within the cities – in line with the Urban Heat Island principle – rose to even more uncomfortable temperatures. Even before I knew it was going to be such a hot summer, I chose the Urban Heat Island as the topic for my Bachelor End Project.

▲ Urban Heat Island of Rotterdam map from Deltacities (Deltacities, 2018).



▲ Figure 1

Halfway the third year of my Bachelor, I started searching for a topic for my Bachelor End Project. As I really enjoyed the GIS project during the VESC fieldwork, I thought doing something within the Geoscience and Remote Sensing department would be a nice idea. Also, because I was planning on starting the MSc track GRS the following year. Eventually, I was redirected to dr. Marc Schleiss, who is working on the Urban Heat Island himself. He proposed that I would research the effect of wind on the Urban Heat Island in Rotterdam and I gladly agreed to that, as my interest for the Urban Heat Island was already kindled during my minor Biodiversity (it was a course on Urban Biodiversity).

To understand how wind could affect the Urban Heat Island (which I will from now on abbreviate as UHI), it is important to know what causes the UHI in the beginning. The main cause is the difference between urban and

natural properties. Constructions, like buildings and pavements, absorb heat which they will emit during the night. This night time emission is a result of the air temperature dropping below the 'construction temperature'. Due to the emission of heat by constructions,

“which can be already the difference between a pleasant summer day and a lot of discomfort caused by the heat”

the temperature of the urban air rises, which results in a difference in urban temperature and rural temperature.

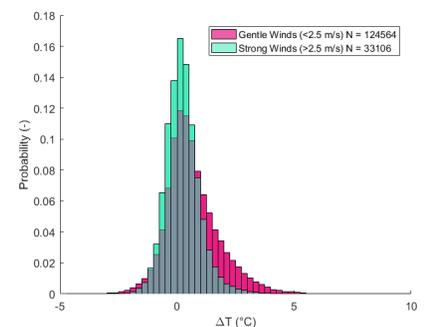
These temperature differences can reach maxima of almost 10 °C, but very commonly reach temperatures up to 4 °C, which can be already the difference between a pleasant summer day and a lot of discomfort caused by the heat. The wind is thought to make the UHI less extreme, as it blows the warm city air out of the city or

towards less heated locations within the city, due the homogenous. Another way that the wind affects the UHI, would be that the wind moves the air so quickly that it cannot be heated properly by the emitted heat from the constructions. However, it should also be considered that construction can break the windspeed as well as funnel it. Therefore, the effect of the wind can be quite dynamic. Thus, it can be a big factor in urban planning, in trying to anticipate to the effects of wind on the UHI.

Within my Bachelor End project, I evaluated 9 locations within Rotterdam (figure 1), of which I compared the temperatures to a rural reference temperature, constructed by interpolating the temperature data of several non-urban weather stations. The measure for the UHI is the Heat Island Intensity ΔT , which is the difference between the measured urban temperature and the computed rural reference temperature.

The heat island intensity is compared to two windspeed categories: Gentle winds (< 2.5 m/s) and strong winds (> 2.5 m/s). To make that compressible, wind speeds below 2.5 m/s are described

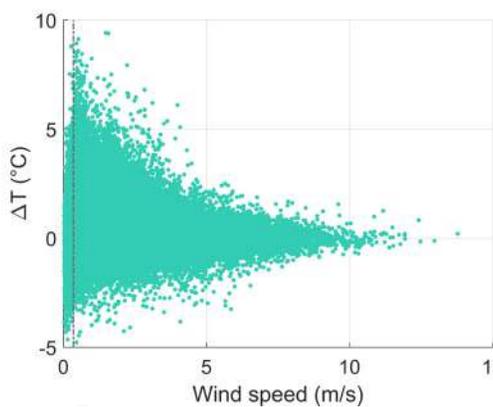
as light breezes, and everything above 2.5 m/s is described as mild breeze up to hurricane. This comparison is presented in figure 2, where it becomes clear that



▲ Figure 2

higher heat island intensities occur at lower wind speeds, which is also very intuitively, because we all know that a day without any wind is - and feels - way warmer than any other day.

Besides this quite straightforward finding, I discovered that at the lowest wind speeds (0 to 0.5 m/s) the heat island intensity did commonly not increase, but it even decreased and often resulted in largely negative values, meaning that the temperature in the rural areas is higher than in the city. This is shown in figure 3 by the grey dashed line.



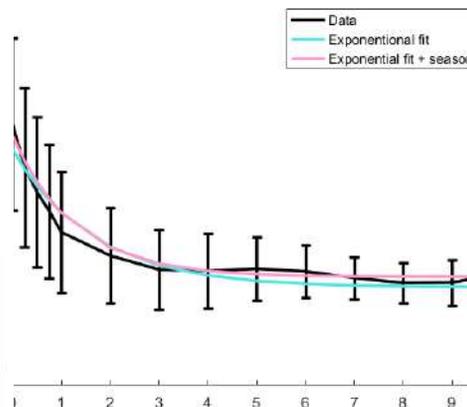
▲ Figure 3

This effect could be described by a process called 'thermal inversion'. When no wind is blowing, only a small portion of air will be heated by the emission from the constructions. As is commonly known, hot air rises and that is exactly what happens here. The heated air rises straight upward, forces down the colder air, but there is no more heat left in the construction to emit into this air. Thus, colder air is measured and might even be colder than the rural reference temperature. This effect is mostly seen during the night and only occurs at urban weather stations located at the ground.

Looking at specific for other stations than ground stations, I found that one station exhibits extremely high heat island intensities and interestingly this was the only station very close to the Rhine (station Rijnhaven). As a water body absorbs heat as well (and a lot of it!), this will also be absorbed during the night, adding to the already emitted heat from the constructions. Together, they heat up the air significantly, creating a large difference between the urban temperature and the rural temperature.

Although it is nice to know all those things, the holy grail would be to predict

the heat island intensity at any wind speed. Although I was not able to create a nicely predictive model (also that would not nearly have been possible in the prospect of a Bachelor End Project), I did find that wind speed negatively and exponentially affects the heat island intensity (figure 4).

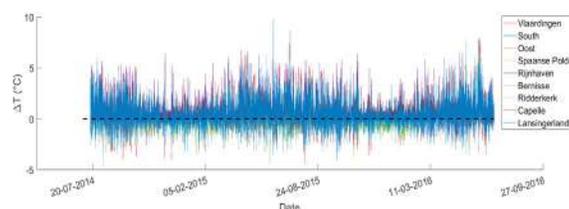


▲ Figure 4

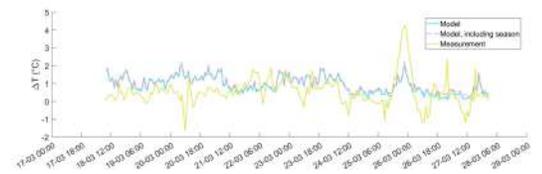
To try to improve the model anyway, I evaluated the influence of the seasons as well, as the time series of the heat island intensity (figure 5) described a clear difference between the seasons, where the heat island intensity is smaller in winter than in summer.

It was indeed found that the probability of a large heat island intensity occurring in Winter (as well as in Autumn) is way lower than in Spring and Summer. For Winter, it could easily be explained as strong winds are way more common during winter, as well as South Western winds (off-shore) which bring air with little moist which is less easily heated. However, both those reasons did not apply to autumn, so that is something for another person's Bachelor End Project. What was found when adding the seasons to my predictive model, is that in Spring the heat island intensities are highest, followed by Summer, Spring and lastly Winter.

To give you an insight in how well my found relationship could predict the heat island intensity, I added figure 6, and as you can see it is not very predictive. But of course, the wind is not the only factor at play. For example, at



▲ Figure 5



▲ Figure 6

the same time another Bachelor student was working on the effect of rain and surface water on the UHI in Rotterdam, which was found to cool whenever the water temperature was lower than the air temperature, but would enhance the Urban Heat Island whenever the water temperature is higher than the air temperature (which is also in line with my finding at location Rijnhaven).

Although I was not able to predict the Urban Heat Island, still my findings could be used in for example urban planning, because a small increase in wind speed could already greatly reduce the urban heat island. Thus, if a smart urban architect finds a way to increase the wind flow within the city the urban heat island problem could be partly mitigated. However, recently I just read that the wind speeds in the city are already higher than in surrounding non-urban areas. So, if our smart urban architect is trying to increase the wind some more it will become nearly impossible to cycle against it for us, the cycle-loving Dutch.

So, we will have to chose between a hardship cycling or general discomfort due to the heat. Nevertheless, taking into consideration things like climate change, continued urbanization and the health risk that come with high temperatures (mortality rates go up 12% at temperatures above 35 oC), you might feel the urge to mitigate the Urban Heat Island. That's how I felt after doing my Bachelor End Project anyway. And if not, if we get another summer like last one and you are within the city, you might understand then.

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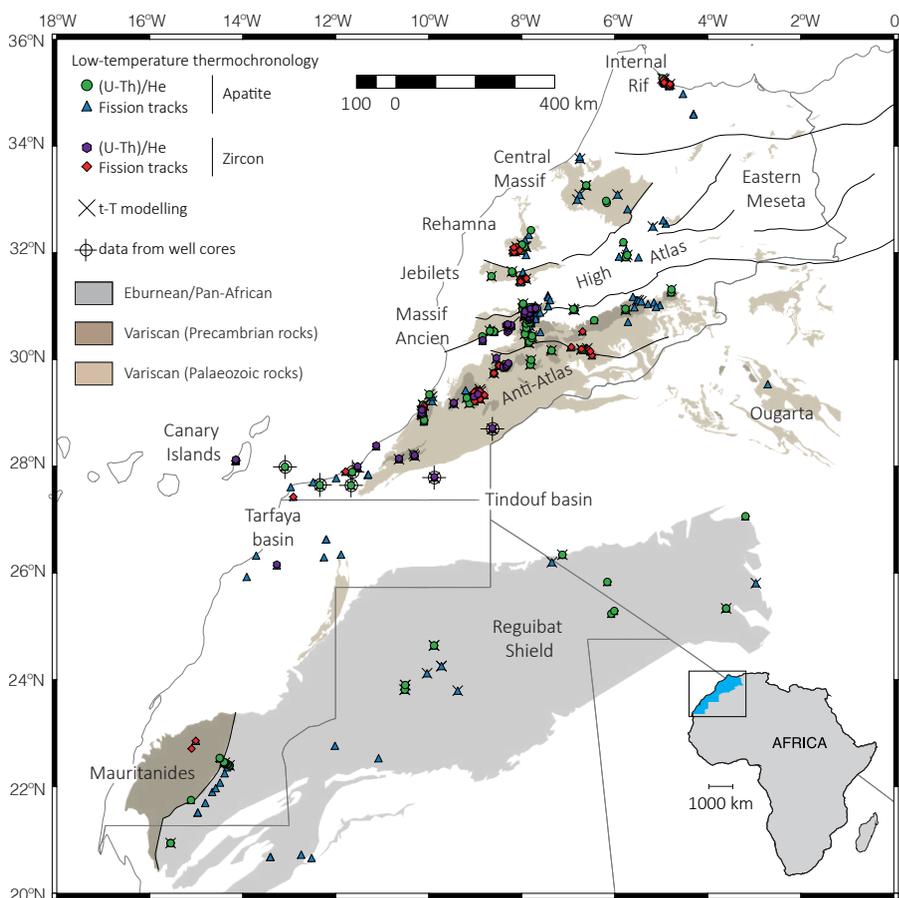


PhD Thesis: Phanerozoic Vertical Movements in Morocco

By R.J.G. Charton

In the past decade, numerous studies have documented km-scale upward and downward vertical movements in the continental rifted margins of the Atlantic Ocean and in their hinterlands. These movements, described as exhumation (upward) and subsidence (downward), have been labelled as “unpredicted” and/or “unexpected”. ‘Unpredicted’ because conceptual, physical, and numerical models that we dispose of for the evolution of continental margins do not generally account for these relatively recent observations. ‘Unexpected’ because the km-scale vertical movements occurred when our record of the geological history is insufficient to support them. As yet, the mechanisms responsible for the km-scale vertical movements remain enigmatic.

Remi’s Ph.D. project was about investigating several aspects of these movements in Morocco (fig. 1). There, over 30 studies of the kind had already been conducted, without reaching a consensus for the timing, location, nor amplitudes of the km-scale vertical movements. He took up the challenge to come up with one robust story for Morocco’s geological past.



▲ Figure 1: Simplified structural map of Morocco and its surroundings overlaid with the location of LTT samples.

About Remi

Rémi graduated in May 2018 from the TUDelft (Netherlands) with a Ph.D. in Applied Geology. In previous years, he received a Bachelor’s degree in Earth Sciences and a Master’s degree in Sedimentology from Dijon (France) and Tromsø (Norway) Universities.

Based at the Technological University of Delft for his post-doctoral research, his current objective is to constrained source-to-sink systems and mechanisms linked to vertical movements in NW Africa with the help of Landscape Evolution Modelling tools.

“I became a PhD candidate of the Applied Geology section in January 2014. Amongst all the advantages of carrying out my research at the TUDelft, I am really thankful for the contact with a lot of excellent industry and academic geoscientists, whilst giving informal presentations for my former fellow PhD students, supervising a score of enthusiastic B.Sc. students, and opportunity to join many field trips in Morocco. We have a very collegiate group, which I think creates an optimum environment to undertake PhD research.”

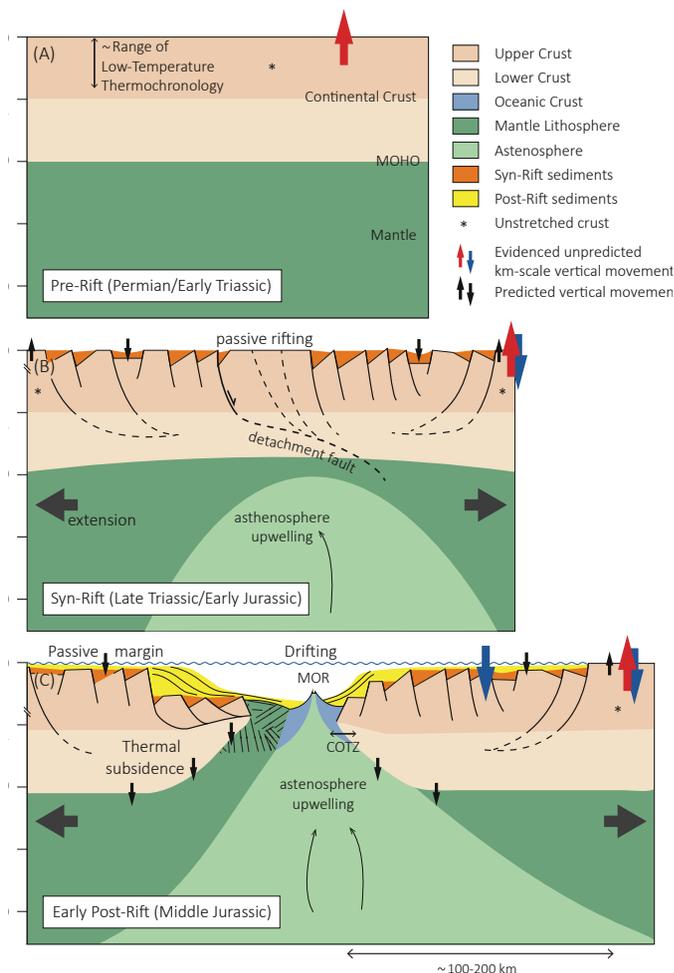
His Ph.D. thesis was supervised by Prof. G.Bertotti and Dr. J.Storms,

Vertical movements in geology

In the case of passive rifting (Allen and Allen, 2013; fig. 2), existing models state that the rift zone and flanks are characterised by lithospheric stretching and may be affected by volcanism and flank uplift. The latter occurs along the footwall of faults of the rift, extending over 100 km into the unstretched crust, reaching up to 1 km in elevation, and leading to intensified erosion. Lithosphere kinematic models characterise the post-rift stage by slow cooling following the continental break-up and thermal subsidence. As observed by Japsen et al. (2012), the continental crust adjacent to passive margins have frequently been described as shoulder uplifts during their syn-rift stage and as tectonically quiescent during their post-rift stage. Furthermore, this assumed inactivity agrees with most conceptual, physical, and numerical models that we dispose of for the evolution of passive margins (reviewed in Watts, 2012).

The Atlantic realm

Pre-rift exhumation episodes are recorded in the vicinity of the future Atlantic Ocean (e.g. Japsen et al., 2016). Syn-rift exhumation episodes have been described in the Atlantic rift flanks (e.g. Jelinek et al., 2014), while syn-rift subsidence episodes have been documented in fewer places (e.g. Ghorbal et al., 2008). Post-rift km-scale vertical movements have been documented along the North (e.g. Japsen et al., 2016), Central (e.g. Bertotti and Gouiza, 2012) and South (e.g. Wildman et al., 2015) Atlantic margins. Exhumation and subsidence episodes occur in regions characterised by both stretched and non-stretched lithosphere, demonstrating that other processes extrinsic to the rifting are at work, or that the effects of the rifting and drifting outreached their margins. Several authors have qualitatively tested aspects of these vertical movements with numerical models (e.g. Gouiza, 2011).



▲ Figure 1: Simplified structural map of Morocco and its surroundings overlaid with the location of LTT samples.

Geo-Thermo-Chronometers

Low-Temperature Thermo chronology (LTT) and time-Temperature (t-T) modelling techniques provide understanding of the thermal history of geologically ill-constrained areas characterised by no or little sedimentary records (e.g. Jelinek et al., 2014). These techniques are commonly employed as proxies to reconstruct vertical movements (e.g. Teixell et al., 2009). Because the LTT ages record the cooling of rock samples, they are linked either to thermal relaxation and/or exhumation. Hence, LTT ages are recorded shortly after magmatic events, during/after processes linked to the creation of topography (e.g. orogenies, shoulder uplift, thermal doming), and/or during processes leading to enhanced erosion (e.g. climatic and sea level changes).

Aims and findings of the study

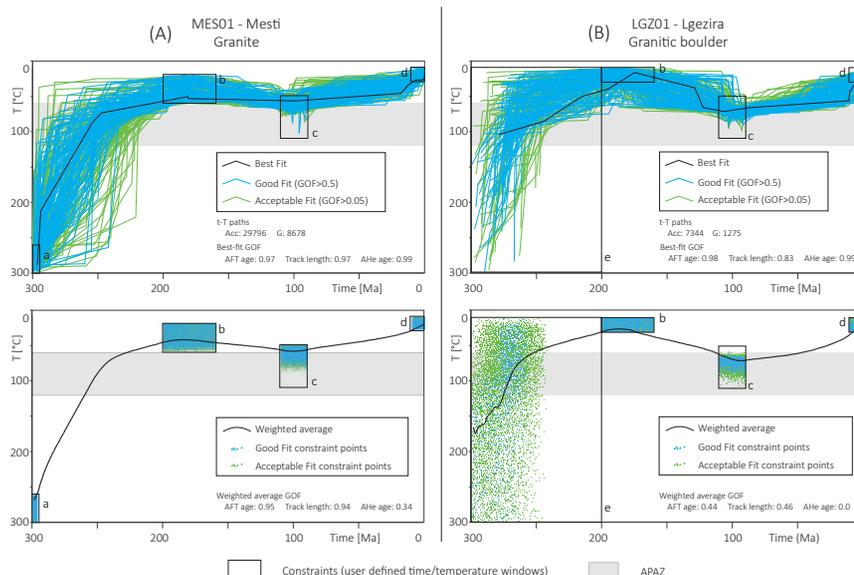
The transition area between generally subsiding domains and mostly exhuming domains, yet poorly understood, was discussed via the evolution of a profile, running across the rifted continental margin. LTT data from the central Morocco coastal area document a km-scale exhumation between the Permian and the Early/Middle Jurassic (fig. 3). The related erosion fed sediments to the subsiding Mesozoic basin to the northwest. Basement rocks along the transect were subsequently buried between the Late Jurassic and the Early Cretaceous.

The post-Variscan thermal and geological history of the Anti-Atlas belt in central Morocco was constrained with a transect constructed along strike of the belt. The initial episode occurred in the Late Triassic and led to a km-scale exhumation of crustal rocks by the end of the Middle Jurassic. The following phase was characterised by basement subsidence and occurred during the Late Jurassic and most of the Early Cretaceous. The exhumation episode extended into the interior of the African tectonic plate, perhaps beyond the belt itself.

Exhumation rates and fluxes of material eroded from the hinterlands of the Moroccan rifted margin were quantified from the Permian onwards. The high denudation rates, obtained in central Morocco during the Early to Middle Jurassic and in northern Morocco during the Neogene, are comparable to values typical of rift flank, domal, or structural uplifts. Periods of high production of sediments in the investigated source areas are the Permian, the Jurassic, the Early Cretaceous, and the Neogene

The Phanerozoic evolution of source-to-sink systems in Morocco and surroundings was illustrated in several maps (c.f. chapter 5 of the Thesis). Substantial shifts in the source areas were evidenced between the central and northern Moroccan domains during the Middle to Late Jurassic and Early to Late Cretaceous.

Finally, the mechanisms responsible for the onset and subsistence of the unpredicted km-scale vertical movements were discussed. We proposed that a combination of the large-scale crustal folding, mantle-driven dynamic topography, and thermal subsidence, superimposed to changes in climates, sea level and erodibility of the exposed rocks, were crucial to the timing, amplitude, and style of the observed vertical movements.



▲ Figure 3: Results of t-T modelling in central Morocco.

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WeberPuzzle : Famous Tankers

by K. Weber

Each of the tankers shown in this puzzle has an eventful history ranging from the earliest ship carrying oil in bulk, heroic achievements in wartime, causing major oil spills or being gigantic. What are the names of these ships?

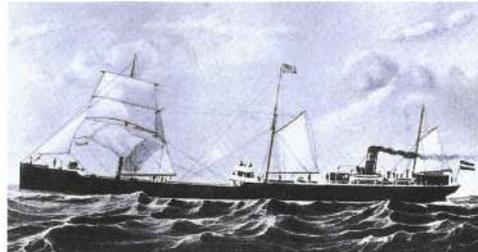
1. The first tanker built for transporting oil in special tanks instead of carrying it in boxes of tin or drums
2. First tanker to cross the Suez Canal in 1892 but torpedoed in 1916.
3. Tanker that managed to reach Malta against all odds and in sinking condition but still delivered its precious cargo in August 1942.
4. Shell tanker that sailed from Australia to India in November 1942. She was intercepted by two Japanese auxiliary cruisers. Badly damaged she nevertheless sunk one of them with her single gun. The surviving crew reboarded the ship and managed to reach port.
5. Large tanker running aground on the Brittany coast in a storm and spilling a very large volume of oil causing massive ecological damage.
6. The largest tanker to be build so far that was even lengthened sometime after completion.
7. Tanker that caught fire after colliding with another tanker near the island of Tobago in the Caribbean. She sank after several explosions. The other tanker was salvaged but in total this accident caused the largest oil spill so far recorded.
8. Tanker running aground on the south coast of Alaska as a result of a steering error. Although she didn't sink, a 100.000 ton oil spill resulted in the death of thousands of sea otters and countless sea birds.

Win a crate of Beer
By following these easy steps

- 1 Make the **WeberPuzzle**
- 2 Take your best *winner selfie*
- 3 Send your answers and your winner selfie to our email before **30th of January**
email: naturalresource-mv@tudelft.nl

Winner will be announced on **10 February**

Glück Auf!





WeberPuzzle : Six Capital Cities in the Oil Region

by K.Weber

Here you see views of six big capital cities of the countries richly endowed with oil fields. Some are still partly looking like they did when the oil boom started, but most have changed dramatically. Several can be recognised by geographical characteristics or a typical building, but for three of them you have to have seen them recently or have watched the news on TV. What are the names of these capital cities?

Most of these cities are quite easy to recognise because of the presence of unique geographical settings, buildings or often published skylines.

1. This skyline of Doha the capital of Qatar was shown recently in several newspapers. Thirty years ago, it looked very different and more in line with the dhow sailing past.
2. Beautiful picture of Teheran looking north, showing the snowy Elbruz mountains as backdrop The skyline of Kuwait.
3. The skyline of Kuwait. Typical are the water tower and numerous water tanks on the roofs. Fresh water is much rarer than oil in this country.
4. The city gates of Muscat, capital of Oman. In the early days of the oil production, the gates were closed during the night.
5. With the Tigris flowing through its centre, it is not difficult to identify Bagdad.
6. Finally, Abu Dhabi which is covered by high-rise buildings especially along the corniche. As you can see, there is also a line of trees which are kept alive by a special watering system.



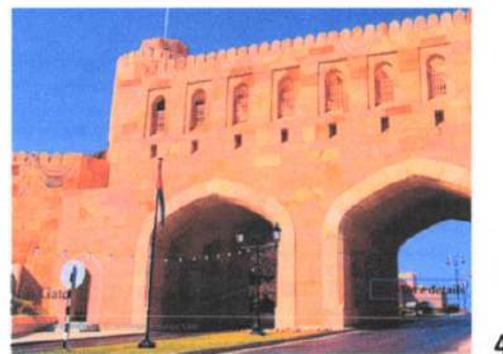
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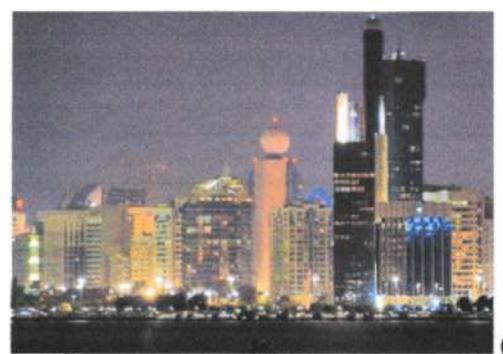
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GRADUATION SUBJECTS

Dr. J.E.A. Storms

Majid Aljamed: "The Eridanos Delta: A Sequence Stratigraphic Study of the North Sea Upper Section with Focus on Shallow Gas Potential"

Dr. P.J. Vardon

Eleni Smyrniou: "Soil Constitutive Modelling Using Neural Networks"

Dr F. Pisano

Putri Suciaty Gandina: "CPT-based Axial Static Capacity Approaches to Evaluate Pile Driveability in Sand"

Prof. dr. W.R. Rossen

Fanxiang Xu: "A Local Time-Stepping Method for Multiphase Flow in Porous Media"

Dr. H.A. Abels

Mohammed Almarzouq: "Petrophysical Characterisation of the Upper Carboniferous Coal Beds at the Southern North Sea Basin"

Prof. Dr. P.L.J. Zitha

Julia Schmidt: "Novel Method for Mitigating Injectivity Issues during Polymer Flooding at High Salinity Conditions"

Dr. H.A. Abels

Matthias Mäder: "Multi-proxy analysis of the sedimentary and climatic response to the Palaeocene-Eocene Thermal Maximum in the Hengyang Basin, Hunan Province, China"

Prof. Dr. G. Bertotti

Dominique Reith: "Dynamic simulation of a geothermal reservoir"

Dr. A. Barnhoorn

Abdulmohsen Al-Mansour: "Electro Facies Based Lithology and Mechanical Modeling: A Proposed Workflow and Models Linkage"

Prof. Dr. D.F. Bruhn

Twan Goense: "Physical Characterization of the Lower Carboniferous Limestone as a potential Geothermal Reservoir"

Prof. Dr. W.R. Rossen

Wendy Flores Martinez: "Liquid Injectivity in SAG Foam EOR"

Dr. H. Hajibeygi

Mohammad Gusti Bastisya: "Multiscale extended-finite-element for reservoir geomechanics"

Dr. H. Hajibeygi

Irina Sokolova: "Multiscale finite volume method for finite-volume-based poromechanics simulations"

Dr. M.W.N. Buxton

Randy Calis: "Reconstruction and safety assessment of the Hengelo Brinefield phase 1 area"

Upcoming Events



Date	Event
NOVEMBER 2018	
12/11-14/11	Study Abroad Week
14/11	Year Drinks
16/11	Bachelor Ceremony
22/11	Freshmen Tikibad Trip
27/11	Python Course
28/11	Committee Drinks
DECEMBER 2018	
01/12	Parent Day
03/12	Company Day
04/12	Sinterklaas at CiTG
05/12	Sinterklaas in het Noorden and StuCo Location Announcement
07/12	Barbararede
12/12	Freshmen Lecture
18/12	Christmas Drinks
28/12-06/01	WiSpo
JANUARY 2019	
08/01	Master and PhD Ice Skating Trip
11/01	Barbara Drinks
16/01	Study Breakfast
28/01-01/02	Exam Week
FEBRUARY 2019	
01/02	Barbara Drinks
04/02-08/02	Second Years Excursion



Colophon

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