

Exam AES4650 Shallow Depth Geophysics, EM methods

Wednesday, April 5, 2006

- 1) Explain for what subsurface properties the GPR is sensitive and how this sensitivity is exploited in GPR investigations. (2 points)
- 2) Describe the two different acquisition set-ups and explain their advantages and disadvantages. (2 points)
- 3) How can GPR be used for layer thickness determination? Describe the type of measurements that are useful and explain the results you expect from them. (3 points)
- 4) How is depth resolution determined for GPR? How is lateral resolution improved in GPR data? Discuss the relation between acquisition and processing. (4 points)
- 5) Discuss the effect of antenna height above the surface. (2 points)
- 6) Discuss the effect of above surface objects on survey design. (2 points)
- 7) For DC resistivity measurements, a stationary electric current is injected in the ground through two electrodes at a certain distance and the potential difference between two other electrodes that are also separated by some distance is measured. How is apparent resistivity defined for this measurement? (3 point)
- 8) What is the difference between the Pole-Pole array and the Wenner array in terms of sensitivity, data coverage and investigation depth. (2 points)
- 9) There are two main differences between the DC Electric Resistivity method and the various Frequency or Time domain EM methods. Discuss the difference in their modes of operation and the difference in survey targets. Explain how they can be optimally combined in a geophysical survey for a subsurface volume with increased conductivity in a relatively resistive environment. (5 points)