

Course Programme  
Applied Geophysics Mod. B  
Second level degree in Geological Sciences and Technologies  
Academic year 2017/18  
Dr. Rosalba Maresca

Classification of methods of geophysical prospecting. Target and shape of an anomaly. Acquisition Geometries. Spacing and aliasing. Planning of a geophysical prospecting survey.

### **MASW method**

The surface waves. Geometrical spreading for body and surface waves. Rayleigh's waves and their genesis. Displacement components of Rayleigh waves. Variation of amplitude with depth. Genesis of Love waves. Dispersion equation. Vibration modes. MASW method. Instrumentation. Acquisition Geometry and parameters. Frequency-wave number analysis - Estimation of the dispersion function - Inversion of dispersion curve for the estimate of the VS profile. Comparison between MASW and seismic refraction methods.

### **GPR method**

electromagnetic waves (em). Remarks on physical quantities that control the propagation of em waves. Wave velocities in materials. Attenuation. Reflection and transmission coefficients. Antennas. Properties of the GPR Method. Depth of investigation and resolution. Data Acquisition. Radargram. GPR profile and section. Monostatic and bistatic configurations. Method of hyperbole for the estimation of the velocity in monostatic mode. Use standard velocities and associated errors. Acquisition in bistatic mode. Interpretation of a GPR trace. Examples and applications.

### **Seismic site response (RSL)**

Microzoning and seismic site response. Seismic classification of soils. SSR method for the experimental estimation of RSL. 1D modeling. Equivalent linear approximation. Microtremors and HVSR method for the experimental estimation of RSL.

### **References**

Corrao M., Coco G. Geofisica Applicata con particolare riferimento alle prospezioni sismiche, elettriche, elettromagnetiche e geotermiche. Flaccovio, 2009.  
Reynolds J. M. An Introduction to Applied and Environmental Geophysics. Wiley, 1997.  
Romeo R. W. La risposta sismica locale per la progettazione strutturale. International Centre for Mechanical Sciences. Monografie CISM, 2007.  
Conyers L.B., Goodman D. Ground Penetrating Radar. Un'introduzione per gli archeologi. Aracne Ed., 2007. ISBN 978-548-0951-2.  
G. Lanzo, F. Silvestri – Risposta Sismica Locale. Teoria ed esperienze. Hevelius Edizioni, 1999.  
Kramer S. L. Geotechnical Earthquake Engineering. Prentice Hall, 1996.