

ENVIRONMENTAL GEODESY

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The Earth system: Systems approach to studying Earth, Climate and weather systems, Mass distribution, transport and exchange in the Earth system, Impact of physical processes on the geometry and gravity of the Earth, Loading theory and the sea level equation. Observation techniques in Geodesy: Geometric techniques – Total stations, Strain meters, Tide gauges, Global Navigation Satellite Systems, Satellite Laser Ranging, Very Long Baseline Interferometry, Satellite altimetry (radar and laser), Interferometric SAR; Gravimetric techniques – Absolute gravimetry, relative gravimetry, satellite gravimetry. Tides: Gravitational interaction of the Sun, Moon and the Earth, Ocean tides Atmospheric tides, Solid earth tides, Doodson numbers. Hydrological Observables: Water storage change, Soil moisture, River runoff and lake levels, Groundwater variability. Oceanographic observables: Sea surface topography and the mean sea level, Ocean currents, Ocean mass redistribution, Ocean bathymetry. Cryosphere observables: Sea ice thickness observations, Ice mass balance, Glacier thickness and drift. Atmospheric observables: Total precipitable water, Ionospheric total electron content, Atmospheric circulation and mass redistribution. Solid earth observables: Elastic, viscoelastic and episodic deformation and gravity responses to geodynamic processes like plate tectonics, earthquakes and volcanic activity.