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Empirical Models"; "4.2 Eliminating TEC"; "4.3 Estimating TEC Using Different Space Geodetic Techniques"; "References"; "3 Path Delays in the Neutral Atmosphere"; "1 Introduction"; "2 Basics"; "2.1 Microwaves"; "2.2 Optical Refractivity of Moist Air"; "3 Definition of Path Delay in the Neutral Atmosphere"; "3.1 Hydrostatic Delay"; "3.2 Wet Delay"; "4 Modeling Delays in the Neutral Atmosphere"; "4.1 Ray-Tracing"; "4.2 Mapping Functions and Gradients"; "4.3 Atmospheric Delays for SLR"; "4.4 Water Vapor Radiometry"; "5 Atmospheric Turbulence"; "5.1 Turbulence Effects on Tropospheric Delays"; "5.2 Estimating C_n^2 "; "6 Applications of Space Geodetic Techniques for Atmospheric Studies"; "6.1 Long-Term Water Vapor Trends"; "6.2 GNSS Meteorology"; "6.3 GNSS Tropospheric Tomography"; "References"; "4 Atmospheric Pressure Loading"; "1 Surface Pressure Variations and Deformation of the Solid Earth"; "2 Modeling Atmosphere Pressure Loading"; "2.1 Geophysical Approach"; "2.2 Empirical Model"; "3 Study of APL Effects on Space Geodetic Measurements"; "References"; "5 Atmospheric Effects on Gravity Space Missions"; "1 Theory of the Gravity Field"; "1.1 Gravity Potential and Gravity Acceleration"; "1.2 Gravity field of the Earth"; "1.3 Spherical Harmonics"; "2 Atmospheric Surface Pressure"; "2.1 Total Mass of the Atmosphere"; "2.2 Variation of the Atmospheric Pressure"; "3 Atmospheric Modeling for Space Missions"; "3.1 Satellite Gravity Missions"; "3.2 Impact of the Atmosphere on Satellite Gravity Observations"; "3.3 From Atmosphere to Gravity"; "4 The Atmosphere and the Ocean"; "References"; "6 Atmospheric Effects on Earth Rotation"; "1 The Earth's Variable Rotation"; "1.1 Parametrization of Earth Rotation"; "1.2 Precession and Nutation"; "1.3 Polar Motion"; "1.4 Length of Day"; "1.5 Influence of the Atmosphere on Earth Rotation"; "2 Modeling Geophysical Excitation of Earth Rotation"; "2.1 Liouville Equations"; "2.2 Excitation Functions"

Sommario/riassunto

Various effects of the atmosphere have to be considered in space geodesy and all of them are described and treated consistently in this textbook. Two chapters are concerned with ionospheric and tropospheric path delays of microwave and optical signals used by space geodetic techniques, such as the Global Navigation Satellite Systems (GNSS), Very Long Baseline Interferometry (VLBI), or Satellite Laser Ranging (SLR). It is explained how these effects are best reduced and modelled to improve the accuracy of space geodetic measurements. Other chapters are on the deformation of the Earth's crust due to atmospheric loading, on atmospheric excitation of Earth rotation, and on atmospheric effects on gravity field measurements from special satellite missions such as CHAMP, GRACE, and GOCE. All chapters have been written by staff members of the Department of Geodesy and Geoinformation at TU Wien who are experts in the particular fields.
