Modeling the Impact of the Three-Dimensional Atmosphere on the Earth's Shape, Rotation and Gravity Field.

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We developed a consistent modeling of the impact of the three-dimensional atmosphere and surface boundary conditions on the mechanical deformation of the Earth and its consequences : surface deformation, Earth's rotation and time-variable gravity.

We model the elastic deformation of the Earth and characterize it with a Love Number formalism of a spherically symmetric Earth's model and present several applications :

The consequences for the Earth rotation are shown using 35 years of the time-variable angular momentum budget of wind and matter terms of the 3D atmosphere, emphasizing its contribution to the Chandler wobble.

The modeling of the time-variable gravity field and station positions, included in the orbit computation software GINS/DYNAMO and GRIM models of the Earth's gravity field, is used for GRACE de-aliasing purposes.

We also produce site positions time series using the GPS analysis software GAMIT/GLOBK with/without inserting several combination of loading models and study their impact on 3D site positions.