Geophysical Research Abstracts, Vol. 8, 06704, 2006
SRef-ID: 1607-7962/gra/EGU06-A-06704

Transverse deflections of an elastic spherical shell as a function of transverse and tangential loads

C.F. Niordson (1) and **S.B. Nielsen** (2)

(1) Department of Mechanical Engineering, The Technical University of Denmark, Kgs. Lyngby, Denmark, (2) Department of Earth Science, The University of Aarhus, Aarhus, Denmark

The thin elastic plate model (the Kirchhof model) in one and two space dimensions has proved extremely useful in providing a simple model of transverse deflections of the Earths lithosphere as a function of transverse loads. For example, the foreland basin of a mountain range is explained by this model by the load of the orogen on the lithosphere, and the primary, asymmetric trough associated with inversion structures in the European plate are explained by the intra-lithospheric load of the inversion ridge. It is well-known from the one-dimensional version of the plate model that the amplitude of the transverse deflection is modified by in-plane tectonic forces originating e.g. at plate boundaries. However, geoscience applications of the coupling between transverse deflections and boundary conditions have been restricted to the one-dimensional thin-plate model. In this paper we extend the model to a spherical thin elastic shell. This configuration is required when geoscience studies move from local scenarios, where the flat-Earth approximation holds, to plate-scale or global scenarios, where the correct application of far-field boundary conditions and the spherical geometry becomes of primary importance.