Isostatic constraint for 2D non-linear gravity inversion on rifted margins

B. Marcela S. Bastos* **and Vanderlei C. Oliveira Jr***

**Observatório Nacional,*

Department of Geophysics,

Rio de Janeiro, Brazil

(June 27, 2019)

GEO-XXXX

Running head: **Isostatic constraint on rifted margins**

ABSTRACT

We propose a non-linear gravity inversion for simultaneously estimating the basement and Moho geometries, as well as the depth of the reference Moho along a profile crossing a passive rifted margin. To obtain stable solutions, we impose smoothness on basement and Moho, force them to be close to previously estimated depths along the profile and also impose local isostatic equilibrium. Differently from previous methods, we introduce the information of local isostatic equilibrium by imposing smoothness on the lithostatic stress exerted at depth. Our method allows deviations from isostatic equilibrium along the profile, so that the interpreter can obtain a set of candidate models that fit the observed data and exhibit different degrees of isostatic equilibrium. Our method also differs from earlier studies because it attempts to use isostasy for exploring (and not necessarily reducing) the inherent ambiguity of gravity methods. Tests with synthetic data produced by a realistic model show the good performance of our method at regions with pronounced crustal thinning, which