Geophysical Research Abstracts, Vol. 9, 04244, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-04244

Predicting trench and plate motion from the dynamics of a strong slab

1 C.Faccenna(1),A. Heuret (2), F. Funiciello(1),S. Lallemand (2), T.W. Becker(3)

(1)*D*ip.Scienze Geologiche, Università degli Studi Roma TRE, Largo *S*. Leonardo Murialdo 1, Roma, Italy,(2)*G*é Montpellier, UMR 5243 CNRSUM2, Università Montpellier2, CC. 60, place *E*. Bataillon, 34095 Montpellier cedex 5, France, (3) Department of Earth Sciences, University of Southern California, Los Angeles CA (faccenna@uniroma3.it /Fax:*30-0654888201 / phone: +39-0654888029)

The motion of oceanic plates is commonly related to the subduction of cold and dense oceanic material into the mantle. These models predict plate velocities from subduction velocities but the trench motion is not directly included in the computation. Here, using a recent compilation of a global data set, we found that the motion of trenches (either advancing or retreating with respect to upper plates) scales with their corresponding subducting plates motion. Based on simple experimental tests, we found that subduction of strong slabs inside the upper mantle correctly predicts these kinematic relationships. We deduce that the motion of the trenches represent the surface manifestation of the resistance encountered by the subducting lithosphere to bend and penetrate within the upper mantle.