

3-D Laboratory and Numerical Models of Mantle Flow in Subduction Zones

F. Funiciello (1), C. Piromallo (2), M. Moroni (3), T.W.Becker (4), C. Faccenna (1), H.A. Bui (5), A. Cenedese (3)

- Dip. Scienze Geologiche, Universita' degli Studi "Roma TRE", L.go S.L. Murialdo 1, 00146 Roma, Italy
- 2. INGV, Via di Vigna Murata 605, 00143 Roma Italy
- 3. Dipartimento di Idraulica, Trasporti e Strade, Univ. Roma "La Sapienza", Via Eudossiana, 20 Roma, Italy
- 4. Department of Earth Sciences, University of Southern California, 3651 Trousdale Pkwy, Los Angeles CA 90089-0740
- 5. Université Pierre et Marie Curie (Paris 6), T 26-0, E1, case 129, 4 place Jussieu, 75252 Paris cedex 05, France

Analogue and numerical studies are powerful tools to gain insight on the subduction process. Here we investigate some results from both approaches in order to characterize the induced flow triggered in the mantle by slab motion. The fluid velocity field in our 3-D laboratory experiments is reconstructed and analyzed through the PTV (Particle Tracking Velocimetry) image analysis technique, which provides a set of velocity vectors centred with particle centroid positions.

Numerical investigation is approached by means of the finite element code Citcom (e.g. Moresi & Solomatov, 1995, Zhong et al., 1998; obtained from geoframework.org), solving the equations for conservation of mass, momentum and energy for an incompressible viscous spherical shell.