Numerical and laboratory models of subduction

E. Di Giuseppe (1), J. van Hunen (1), F. Funiciello (2), C. Faccenna (2), M. Moroni
(3), D. Giardini (1)

(1) Institut für Geophysik, ETH-Zürich, Switzerland, (2) Dip. Geologia, Univ. 'Roma Tre',
Roma, Italy, (3) DITS, Univ. 'La Sapienza', Roma, Italy
(erika.digiuseppe@tomo.ig.erdw.ethz.ch)

Laboratory and numerical models of the subduction process can give a detailed and
complementary description of behavior of the subducting lithosphere.

Advantages of laboratory models are the three-dimensionality of the system, natu-
rally obtained with this approach, and the easiness in reproducing compositional lay-
ering, and brittle processes such as faulting and fractioning. Numerical models offers
a means to study complex larger scale processes such as phase transition, power-law
rheology or temperature-dependent viscosity and buoyancy, and allow for extensive
and reproducible parameter studies.

Here we present the preliminary results obtained with the final goal to bring the two
methods closer together through application of analogue material to study the subduc-
tion process with temperature-dependent viscosity and -density and dynamical full
3-D numerical models performed with the finite element code Citcom, solving the
equations for conservation of mass, momentum, composition and energy for an in-
compressible viscous Cartesian box.

Such improvements allow for new benchmarks to better constrain the limits of both
methods.