Geophysical Research Abstracts
Vol. 12, EGU2010-2674, 2010
EGU General Assembly 2010


# Kinematic setting and structural control of arc volcanism

Valerio Acocella and Francesca Funiciello
Università Roma Tre, Dipartimento Scienze Geologiche, Roma, Italy (acocella@uniroma3.it, +39 06 5488 8201)

The evaluation of the kinematic setting and the structural control of volcanic arcs is important to define the tectono-magmatic processes along convergent plate boundaries. However, our knowledge is fragmented and the available data highlight different behaviours. This study analyzes the kinematic setting, the structural control and the volcanic productivity of 16 arcs. These arcs are characterized by predominant extensional, compressional, strike-slip or oblique motions. There is an overall coupling between the normal vs. parallel motions along the arc and those of the underlying slab. Therefore, the higher the trench-normal (or parallel) component of the subduction rate, the higher is the amount of arc-normal (or parallel) motion. This relation confirms that strain partitioning is, in general, feasible at many convergent settings, involving also the volcanic arc portion. The arc-normal motion may be characterized by extension or compression, as a function of the increase in the trench-normal convergence (or subduction) velocity. The lack of an evident relation between the subduction rate (or convergence rate) and the volcanic productivity of the arc is partly inconsistent with previous studies, which highlight a relation between the subduction rate and melt production below arcs. This discrepancy mainly suggests that different processes control the generation, rise and eruption of magma at different depths, varying the intrusive/extrusive ratio along arcs. The structure of the arc does not control the distribution of the volcanoes; however, it does control the volcanic output through different processes, even though regional or local extension (associated with strike-slip or compressive structures) is the ultimate requisite, in any setting. In general, the higher the amount of extension, the higher is the output rate along the arc.