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Constraints on the source of the Campi Flegrei (Italy) recent bradyseism from the deformation pattern history.

Luca Crescentini, Antonella Amoruso, and Ilaria Sabbetta
Università di Salerno, Dipartimento di Fisica, Fisciano, Italy (luca.crescentini@sa.infn.it)

The Campi Flegrei (CF) caldera, a high-risk volcanic area located West of Naples (Italy), is generally uplifting since a few years, after a 20-year-long subsidence started at the end of the recent 1982-84 unrest. Few mini-uplifts with consequent total or partial recoveries are superimposed on the multiannual trend.
At EGU 2012, we already showed some preliminary comparisons between the deformation patterns of the different episodes and the 1995-2000 subsidence period, using levelling and triangulation data for the 1982-84 unrest and SAR data (courtesy of IREA/CNR, Naples, Italy) since 1995 to 2007, now extended to Autumn 2010.
Our most recent work leads to consolidate part of the previous conclusions but change others.
Until 2007, all the deformation patterns, both uplifts and subsidences, coincide within errors and noise. As regards the Eastward displacement during the 2005-06 miniuplift, seeming differences shown at EGU 2012 disappear if a uniform Westward displacement is subtracted from the data. The origin of this bias is unclear, but its magnitude is comparable with seasonal fluctuations.
After 2007 the deformation pattern seems to be given by the combination of the "usual" pattern and an "anomalous" side uplift, whose origin is under investigation.
Although we have recently shown that geodetic data related to the 1982-84 unrest are unable to discriminate among some possible source models, comparisons discussed here help to disprove some of the source models. Any source mechanism should guarantee full symmetry between inflation and deflation to be a plausible candidate. This is a strong (physical more than mathematical) constraint that is not always fulfilled by recently proposed mechanisms. For example, the similarity between uplifts and subsidences does not support fluid injection as the main source of the CF deformation, because published simulations, despite their relative differences, always agree in predicting very dissimilar uplift and subsidence patterns.
A further implication of the deformation pattern may relate to the capability of the ring faults to slip frictionless, as suggested in the past. If the ring faults were effective, they would depress horizontal displacements even more than vertical displacements out of their own borders. This effect is not visible on SAR data.