



Synergy of PSInSAR and GPS measurements

A.Ferretti(1), F.Novali(1), C.Prati(2), G.Savio(1) and F. Rocca(2)

(1) Tele-Rilevamento Europa T.R.E. S.r.l. (2) Dipartimento di Elettronica e Informazione - Politecnico di Milano

GPS and Permanent Scatterer SAR Interferometry (PSInSAR) are complementary tools for accurate land displacement monitoring. A synergistic approach to monitoring ground movement offers great possibilities that should be further explored. For example: (1) PS data can identify the optimal location for establishing permanent GPS stations by detecting areas that lack the necessary stability for survey control; (2) GPS data from permanent stations can be used as reference control points in computing PS deformation values (calibration); (3) vertical movement of PS can be more accurately determined by removing the horizontal component of motion derived from GPS measurements; (4) precision assessment and error bar computation is enhanced when cross-checked with GPS data. The work performed by TRE in cooperation with POLIMI and other universities (in particular University of Miami, UC San Diego Scripps, and Berkeley) on a synergistic approach is encouraging. In this paper we present results obtained on three different areas, namely, New Orleans, San Francisco Bay Area, and the Venice lagoon. For New Orleans and Venice we present a new subsidence map obtained using PSInSAR data calibrated using permanent GPS stations. Using a combination of GPS-measured horizontal velocities of 200 sites and more than 100,000 PS time series in the San Francisco Bay area, we resolve vertical motions in the region at sub-mm/yr. precision.