



## **Atmospheric Corrections for SAR Interferograms of the Province of Benevento, Southern Italy**

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The estimation and the forecasting of the atmospheric correction are key points determining the precision of the digital elevation models and terrain displacements detected by InSAR, especially in mountainous regions, where significant differences in temperature and pressure can occur among pixels of the same image. This work is intended to model the magnitude and the spatial distribution of atmospheric effects on SAR interferograms of the province of Benevento, Italian Southern Appennini. For this purpose, SAR interferograms are produced for the region of interest using the historical series of ERS-1/ERS-2 SAR observations. After consideration of the quantitative level of landslide contributions (maximum of the order of few tens of millimeters per year), the remaining differences among these interferograms are interpreted and analyzed in terms of atmospheric artifacts. In particular, these differences are calculated and employed to model the statistical occurrence and configuration of micro-climates in the observed region, which is mountainous and much structured by steep slopes (altitude varies from less than 100 m a.s.l. to more than 1800 m a.s.l.). Different kinds of two-dimensional mathematical models are taken into account to estimate the spatial distribution of the interferometric phase shift due to atmospheric effects. In particular, the parameters of these models are estimated by best fitting the observed differences among the experimental interferograms. Finally the precision of these models is discussed, also by taking into account the true ground based topographical information that is available in correspondence of several permanent scatters.