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Scatterer identification and analysis using combined InSAR and laser data

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The geolocation of coherent radar scatterers, used for InSAR deformation analysis, is often not accurate enough to associate them to physical geo-objects. The imaging geometry of satellite InSAR results in (i) biases in the entire point field, and (ii) quite elongated and skewed confidence ellipsoids in the range, azimuth and cross-range direction. The metric defined by the covariance matrix of the InSAR results defines the optimal way to associate scatterers with geo-objects.

Laser scanning point clouds, stemming from aerial or terrestrial laser surveys, yield very dense geometry of geo-objects and topography.

Here we combine InSAR and laser point clouds, taking the covariance metrics of the InSAR data into account. This enables us to correct the positions of InSAR data, to provide a geometric match with geo-objects. We demonstrate how this allows for adding contextual information as attributes to individual scatterers, which improves the interpretation of the InSAR results.