

Looking to glacier by microwaves: examples from Alps and Pyrenees

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Ground Based SAR (GB-SAR) interferometry, is a consolidated remote sensing technique to monitor ground displacements. During the last decade it has gained interest for monitoring instable slopes in near real time. However, in the literature can be found a range of applications where the techniques can be potentially a valuable tool. One of these applications is the monitoring of glaciers. One of the main reason is that alpine glaciers are often located on steep [U+FB02]anks, steep slopes and narrow valleys, often making the use of other techniques not suitable.

In this work are shown the results of two GB-SAR surveys aimed at monitoring two Alpine glaciers located in Italy and Spain respectively. The target of the surveys is different for each case, development of integrated monitoring systems in the Italian case and glacier dynamics in the Spanish case. However both cases are good examples of the main difficulties to be faced using GB-SAR for alpine glacier monitoring: the dominant role of the atmospheric phase screen (APS) on radar signal propagation. The meteorological conditions, which affect the dynamics of the glaciers, deeply influence the GB-SAR response behaviour, demanding a careful analysis of the amplitude of the radar signal, to characterize the surface, and of the interferometric phase, to evaluate the role of the APS. Only after the correction of the APS, a final accuracy of a few millimeters/day was attained in the daily velocity of the glacier in both cases.