METHOD FOR PROCESSING MULTI-PASS RADAR DATA FOR SENSING AND ANALYSING MULTIPLE COMPONENTS OF NON-STATIONARY SCATTERERS

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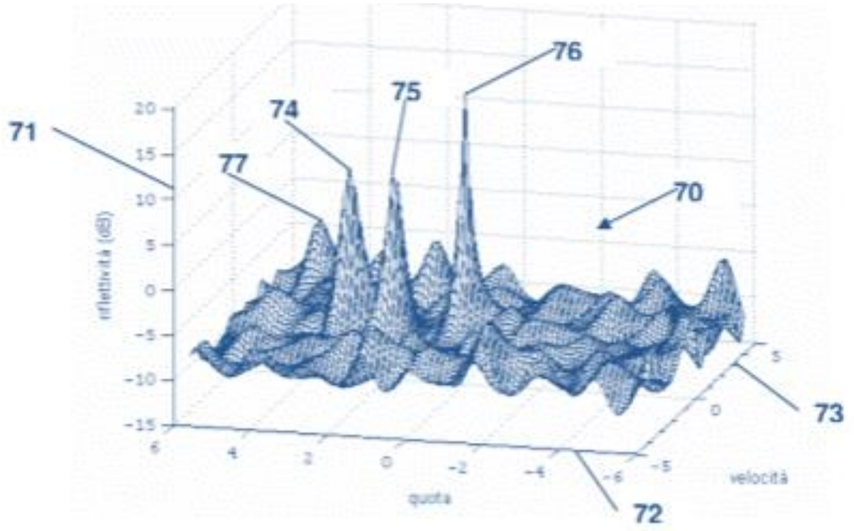
Invention

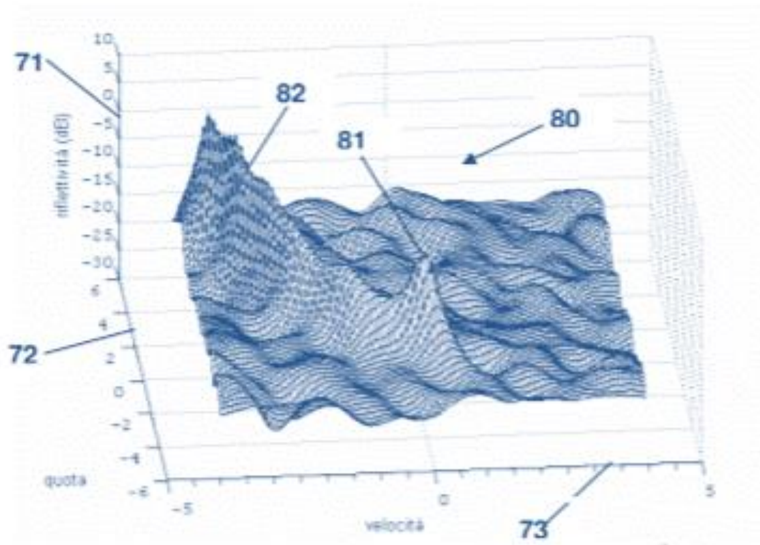
The present invention relates to the field of radar remote sensing, for the extraction of maps, in any metrological and lighting condition, for environmental monitoring, prevention of natural hazards, management of related emergencies and geophysics, relating to phenomena such as topographic and subsidence detection, glacial melting, deforestation, detection of environmental events also extreme ones such as, for example, earthquakes, shifting of earth tectonic plates, protection and characterization of the territory, civil protection.

The invention refers to a method of processing interferometric image radar data, acquired in multi-pass configurations, for the detection and analysis of multiple components of non-stationary radio backscatter at different altitudes and/or displacement speeds.

The techniques in use to date have the disadvantage of using in the processing a simply one-dimensional domain, only spatial or only temporal, or they also use a dual domain (temporal or spatial, respectively), but corresponding to a model for a single backscatter and therefore in an incomplete way. The patented method is able to obtain a more reliable and complete content, new compared to the above-mentioned known techniques, by exploiting SAR data archives more extensively.

Drawings & pictures





The proposed method allows obtaining a differential tomographic image (70) describing the radio reflectivity (71) reconstructed as the altitude (72) of the displacement velocity (73) varies, at three isolated layover backscatterers on which three dominant reflectivity peaks (74,75,76) depend, with a satisfactorily low maximum level of ambiguity (77).

Industrial applications

Telecommunications, remote sensing and aerospace industries

(radar techniques, signal and image processing, remote sensing for environmental monitoring and civil protection).

The use of the technology may concern the monitoring of slow deformations and detection of other dynamic parameters in complex areas (glacier ablation, landslide movements, water level variations in marshy or flooded forest areas), and the detection of topographic and stratigraphic maps of areas subject to temporal disturbances such as soils, forests, glacial and snowy areas, urban areas, steeply sloping areas, quarries, mines, etc.

Possible developments

Environmental monitoring, prevention of natural hazards, management of related emergencies and geophysics are the main purposes of the proposed technology.

Collaborations with industrial partners are expected to increase the number of experimental tests, and therefore the technological readiness level of the invention; possible licensing or transfer for the technology exploitation by interested third parties or companies may be discussed.

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