

AN APPLICATION-ORIENTED PERSISTENT SCATTERER INTERFEROMETRY SOFTWARE PLATFORM, SKYSENSE-INSAR

Fulong Chen^{a}, Hui Lin^a, Aiguo Zhao^a, Xianzhi Hu^a, Tao Li^a and Ruya Xiao^a*

^a Institute of Space and Earth Information Science, The Chinese University of Hong Kong, Shatin, N.T., Hong Kong, China; Tel: +852-39434404; [E-mail: chenfulong@cuhk.edu.hk](mailto:chenfulong@cuhk.edu.hk)

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ABSTRACT: Nowadays, the advance of SAR interferometry, so-called persistent scatterer interferometry (PSI) has proven to be an effective tool for surface displacement monitoring with millimeters accuracy using multi-temporal SAR images over the same scene. In general, the PSI can be divided into two categories. The first involves identifying persistent scatterer pixels, whose scattering signature remain stable in time and when viewed from different angles; the original or even higher resolution than SLC images can be derived. The alternative involves taking many interferograms formed with the small baseline and inverting them to derive incremental displacements with time on distributed scatterers; multi-looking and filtering are preferred to increase the signal-to-clutter ratio of interferograms.

With the explosive development of PSI (e.g. Ferretti et al. 2011), however, the professional software service is inadequate, generally including commercial tools of GAMMA IPTA, SARscape and EarthView, and open source tools of StaMPS/MTI. Furthermore, the feasibility of them can be limited when specialized applications are involved, such as the surveillance of large-scale linear structures, permafrost environmental scenarios, urban agglomerations, and sparse vegetated instable slopes. In this study, an application-oriented PSI software platform— SkySense-InSAR will be developed, supported by the funding from the Innovation and Technology Support Programme of HKSAR, China (ITS/152/11FP). After the framework designing, three PSI models will be further exploited, 1) slope instability-oriented SB-InSAR, 2) large-scale oriented StaMPS/SBAS, 3) natural scenario-oriented SqueeSAR/LS. Study sites include Hong Kong, Pearl Delta River Region and Tibetan Plateau, respectively. Challenging PSI products (velocity rates, historical deformations, refined DEM) as well as perspectives and summaries will be presented on site.