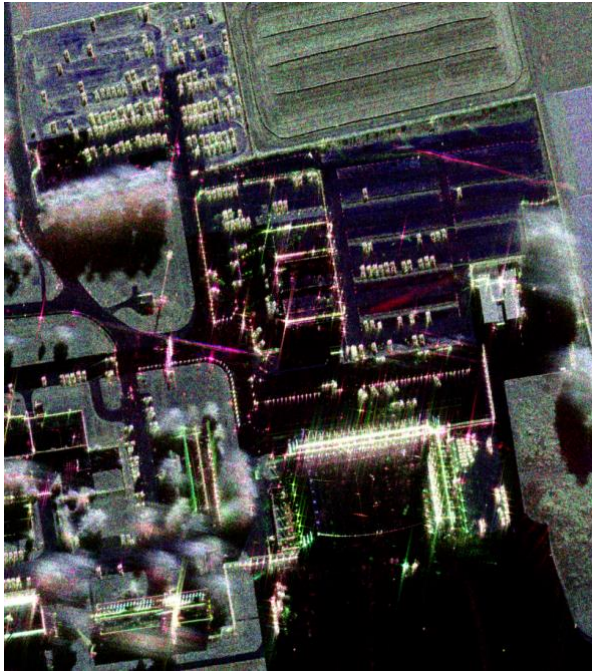
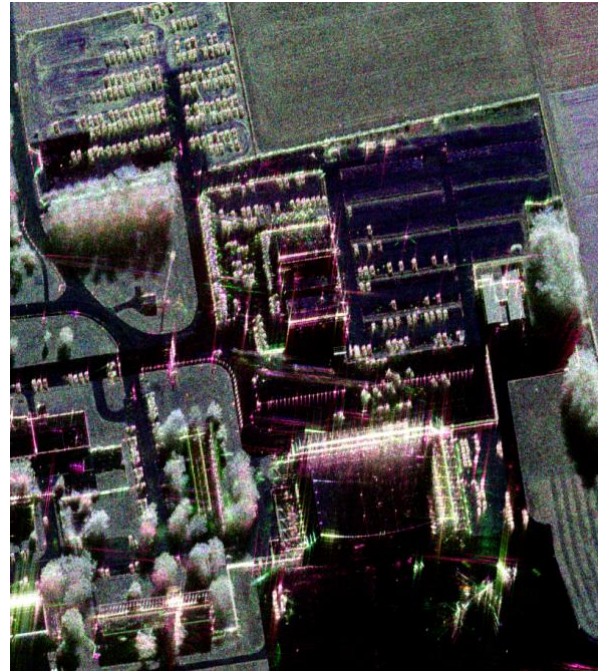


Change Detection with Polarimetric SAR imagery



Reference Image



Test Image

Background & Relevance:

Image change detection is an approach by which two or more images of the same area acquired at different times are compared. It is useful for observation of environmental and human activity, risk management, agricultural surveys, and urban studies. Some of these applications require collecting data independently of weather and daylight conditions. For this reason, synthetic aperture radar (SAR) offers a valuable alternative to optical sensors providing time series data with fine temporal and spatial resolutions. A polarimetric synthetic aperture radar (PolSAR) provides additional information by exploiting the vectorial nature of the electromagnetic waves. Depending on the transmitting and receiving polarization, PolSAR sensors can operate in a) fully-polarimetric b) dual polarimetric, and c) compact polarimetric mode. PolSAR allows the generation of multiple polarimetric descriptors, sensitive to changes in land use and land cover. For this reason, PolSAR is a better tool for change detection than single polarization SAR. In this MSc thesis, the current status and potential of polarimetric SAR for change detection purposes in urban and/or natural environments shall be investigated.

Study area:

- Space: multiple locations in Switzerland and Germany
- Time: data recorded in 2013 and 2019



Data Input:

- Fully-polarimetric SAR images recorded by DLR's F-SAR

Analysis tasks (to be discussed):

- Identify the advantages offered by different polarimetric configurations (full-pol, dual-pol, compact) for detection of different change types
- Develop corresponding methods in MATLAB®/Python
- Performance analysis of different change detection methods

Objectives:

- Develop different change detection methods suitable for single-polarization, dual-polarization and quad-polarization SAR imagery
- Identification of most effective polarimetric descriptors for different change types

Links & References:

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