Appropriate Land Applications

Some Examples

ISPRS Student Consortium Workshop

- Agriculture monitoring
- Aquaculture mapping
- Digital Elevation Model
- Flood mapping
- Forest mapping
- Geomorphology
- Monitoring of Land Subsidence
- Subsidence Monitoring of Building Sinking
- Rice mapping
- Snow mapping
- Urban mapping
- Wetlands mapping

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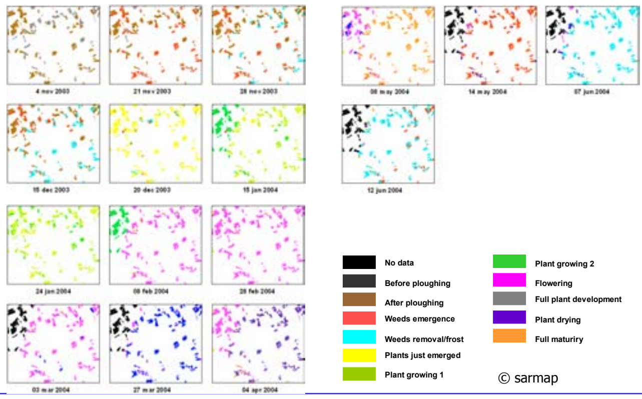
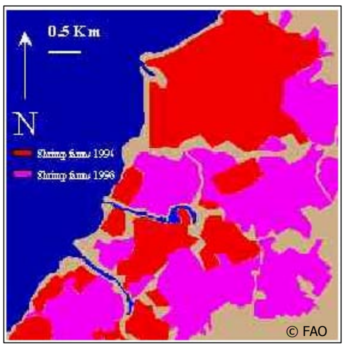
Agriculture Monitoring

The SAR based products illustrated below show the different crop growth moments during a crop season in South Africa. Different colours represent different growing stages at different dates at field level.



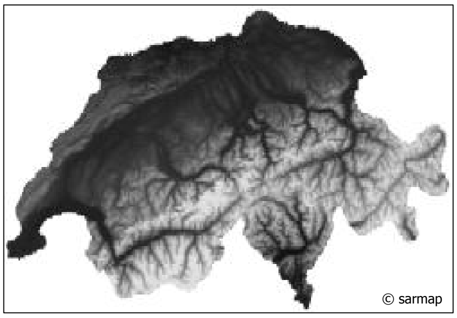
Aquaculture Mapping

The methodology is applied to ERS-2 SAR data acquired in 1996, 1998 and 1999 in an area of Sri Lanka. The map, illustrated below, shows three classes: Water bodies (blue), Shrimp farms occurring up to 18 April 1996 (red), and Expansion of shrimp farms up to 16 October 1998 (pink).



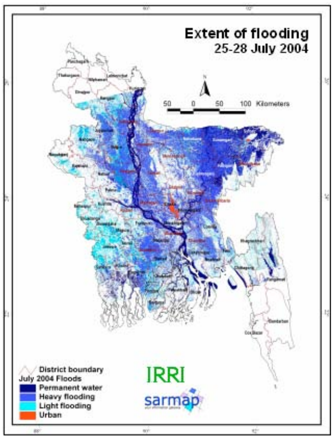
Digital Elevation Model Generation

This DEM of Switzerland covers an area of approximately 41,000 km^2 with heights ranging from 200 m to 4650 m. This product has been generated using 70 ERS scenes, namely 22 descending pairs and 13 ascending pairs. The DEM, which is projected in the Swiss cartographic system (Oblique Mercator), has a grid size of 25 metres.



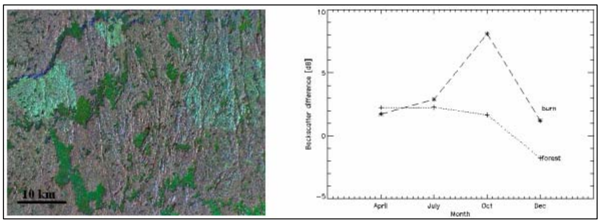
Flood Mapping

The map shown on the right is based on the ratioing of two pairs of ENVISAT ASAR Wide Swath scenes (e.g. 25 July 2004 and 23 March 2003) covering the whole of Bangladesh, and combining this with information relevant to the terrain height (e.g. a Digital Elevation Model) during the classification step. The map shows flooded areas (blue and cyan), permanent water (black), and urban areas (red).



Forest Mapping

The figure below shows a colour composite image from part of Saskatchewan, Canada. Water bodies are shown in dark green and dark blue. To the left is an area that burnt during the summer of 1995, clearly visible in cyan. To the right the blue-green area is an area that burnt prior to 1995. In the graphic on the right, normalised SAR values are shown for a forest area and an area that burned in summer 1995. There is an increase of over 6 dB in the backscatter values of the burned area with respect to forest in the October image. Although this falls again by January, it remains almost 3 dB above the backscatter of unburned forest detected.



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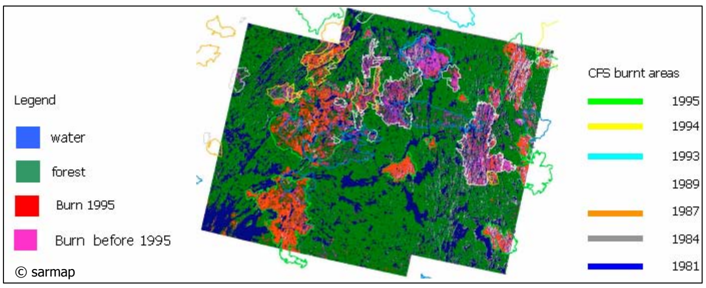
Forest Mapping

Results of the semi-automatic burnt area detection are shown in the figure below. Burnt areas have been mapped as those which burned in 1995 and those which burned in previous years. Burnt area polygons provided by the Canadian Forest Service are overlaid.



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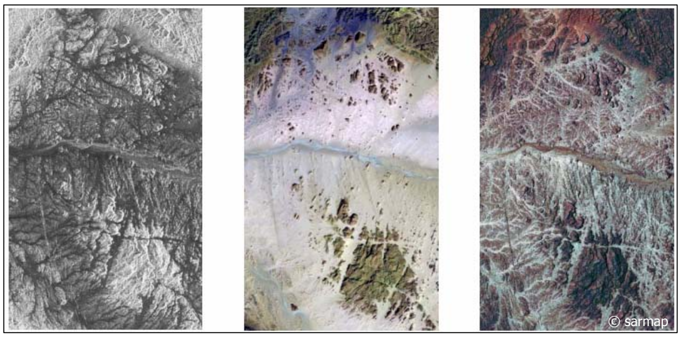
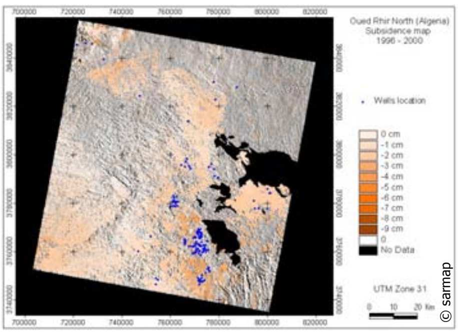
Geomorphology

The figure below shows an ERS-1 (left) and corresponding Thematic Mapper (centre) image of an arid area in Sudan. On the right part the SAR and multi-spectral data have been merged by means of a colour transform (RGB to IHS). This example highlights how optical-radar data fusion can significantly enhance the information content for morphological and geological mapping.



Monitoring of Land Subsidence

The figure shows a land subsidence map from an area of Algeria, which has been produced using ERS-1 and 2 SAR data acquired in the period 1992-2000. In this case the land subsidence is due to significant water extraction activities. What is visible in the figure below, is a general subsidence trend that crosses the center of the image in the NW-SE direction. It is worth noting that the most of the wells (blue crosses) are distributed over this subsiding area.



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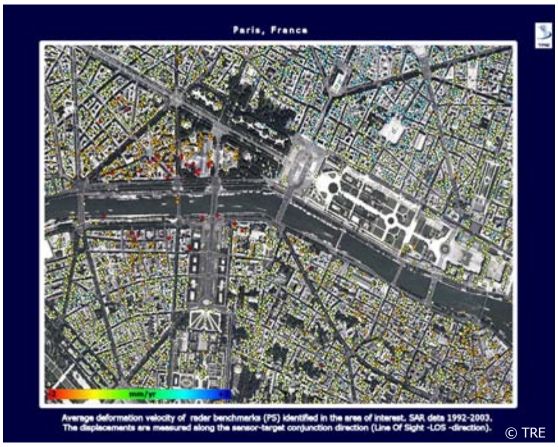
Monitoring of Building Sinking

The figure on the right shows the average deformation velocity of radar benchmarks (PS) identified in an area of Paris (France) by using ERS-1/2 SAR data from 1992 to 2003. Displacements are measured along the direction of the sensor target conjunction.



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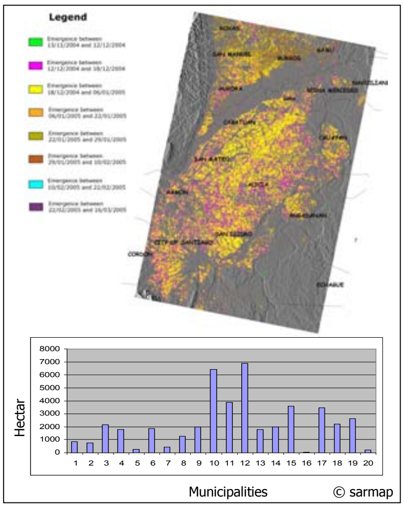
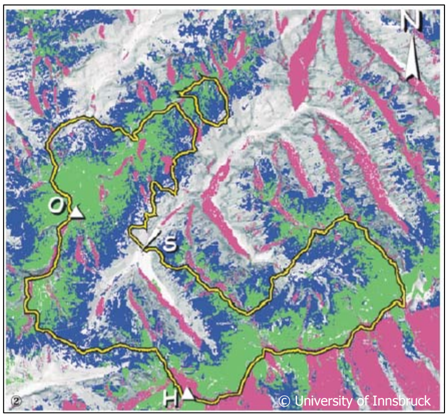
Rice Mapping

Based on multi-temporal ENVISAT ASAR and RADARSAT-1 data, a rice map, indicating the rice emergence moments has been generated for an area in the Philippines. The rice acreage statistics are stored in map format showing the rice extent (top) and, in form of numerical tables (bottom), quantifying the size of the area cultivated by rice at the smallest administrative level - typically village unit.



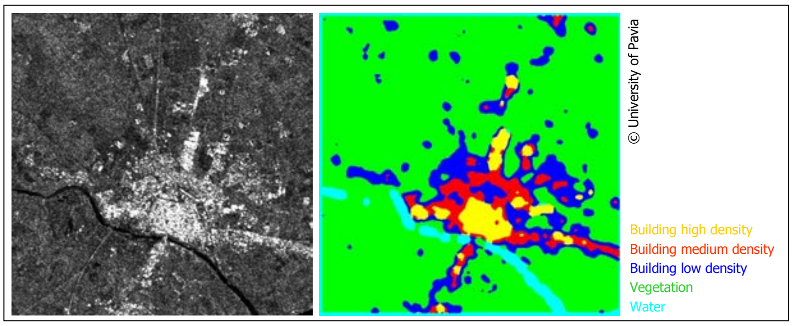
Snow Mapping

The figure on the right shows a snow map on 12 May 1997 (blue and green) and 16 June 1997 (green only), based on ERS-2 SAR images of ascending and descending passes. In areas of residual layover (magenta) no information can be extracted. The boundaries of the Schlegeis basin (Austria) are shown in yellow. On the lower right the fraction of residual layover is high because it is covered only by the descending image. The snow area decreased from 97 km^2 on 12 May to 61 km^2 on 16 June.



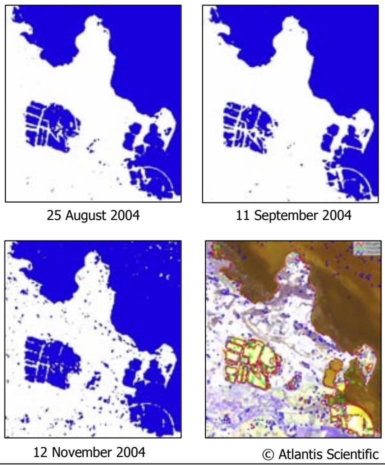
Urban Mapping

The figure below illustrates an ERS-1 SAR scene of the Pavia (Italy) acquired on August 13th 1992 and the resulting map.



Wetlands Mapping

Multi-temporal RADARSAT-1 data acquired on August, September and November 2004 over the Littoral Audois (France) have been used to generate the Water Cycle Regime Product (figure right bottom). This product has been obtained by combining the three water / flooded vegetation maps (figures top right, top left, bottom left) , which were produced by thresholding each image. The resulting product gives a clear indication of the water cycle during this period.



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