This special issue covers topics discussed during the 37th EARSeL Symposium held in Prague in June 2017. The word smart has been used very often during the past years. The use of the word in improving humankind’s way of living in relation to the Earth – its way of functioning and its exploitation – concerns many branches, including remote sensing.

Remote sensing is a powerful tool, which delivers various data on our Earth. Remotely sensed data are records of the state at the moment of the measurement and are irreplaceable for evaluation of the endless change occurring on the Earth surface. The data are more and more frequently available, with details ranging from a few centimetres to hundreds of meters, with a long list of spectral resolution, and therefore able to cover a wide range of applications.

Topics of the Special Issue vary from land surface deformations to DSM, forest dynamic cycle, crop, river ice, sea water quality, soil erosion measurement – in detailed areas, using models to analyse rills and gullies on one side and a region of the country on the other side – urban areas, slums and historical realms in Nazca in Peru, Erbil citadel in Iraq, and in burial sites dated 1300 – 1050 B.C.

Applied Remote Sensing data has shown the importance of SAR data presented in various projects. Persistent Scatters method of interferometry was used for deformation and glaciers movement detection, and SAR data with dual-polarimetry and quad-polarimetry for river ice detection. Their comparison showed that there is almost no difference in the accuracy. However, complex river ice cover area was an exception.

Examples of thermal data application bring relatively different data types – detailed thermal measurements from UAV for agricultural crop classification, airborne data for the surface temperature and mosaicking, and space-borne data with high temporal and low spatial resolutions together with data with high spatial and low temporal resolution. Application of the most promising thermal methods relies on the fusion of spatially interpolated high temporal resolution data with temporally interpolated high spatial resolution data. RPAS optical data was combined with InSAR processing and RPAS optical data for glacier movement detection in Greenland and Iceland.

Of all, optical data are the most frequently used data in remote sensing. Forest long-term dynamics in Andean Amazon analysed from Landsat data were focused on deforestation and reforestation. This approach combines image compositing, multi-sensor data fusion, and post-classification change detection that is applicable in data scarce regions. Laser scanning data were used for a new method for automatic road line marking.

The papers of this special issue are an example of the wide range of applications, data types and ways of data collection which are not only a reflection of the issue, but of the present remote sensing. Individual papers and their results form just a small part of the complete knowledge about individual objects on the Earth and their history and development, including methods on how to perform the given tasks.

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