World Academy of Science, Engineering and Technology
International Journal of Environmental and Ecological Engineering
Vol:13, No:02, 2019

Seasonal Assessment of Snow Cover Dynamics Based on Aerospace Multispectral Data on Livingston Island, South Shetland Islands in Antarctica and on Svalbard in Arctic

Authors : Temenuzhka Spasova, Nadya Yanakieva

Abstract : Snow modulates the hydrological cycle and influences the functioning of ecosystems and is a significant resource for many populations whose water is harvested from cold regions. Snow observations are important for validating climate models. The accumulation and rapid melt of snow are two of the most dynamical seasonal environmental changes on the Earth's surface. The actuality of this research is related to the modern tendencies of the remote sensing application in the solution of problems of different nature in the ecological monitoring of the environment. The subject of the study is the dynamic during the different seasons on Livingstone Island, South Shetland Islands in Antarctica and on Svalbard in Arctic. The objects were analyzed and mapped according to the European Space Agency data (ESA), acquired by sensors Sentinel-1 SAR (Synthetic Aperture Radar), Sentinel 2 MSI and GIS. Results have been obtained for changes in snow coverage during the summer-winter transition and its dynamics in the two hemispheres. The data used is of high time-spatial resolution, which is an advantage when looking at the snow cover. The MSI images are with different spatial resolution at the Earth surface range. The changes of the environmental objects are shown with the SAR images and different processing approaches. The results clearly show that snow and snow melting can be best registered by using SAR data via hh- horizontal polarization. The effect of the researcher on aerospace data and technology enables us to obtain different digital models, structuring and analyzing results excluding the subjective factor. Because of the large extent of terrestrial snow coverage and the difficulties in obtaining ground measurements over cold regions, remote sensing and GIS represent an important tool for studying snow areas and properties from regional to global scales.

Keywords : climate changes, GIS, remote sensing, SAR images, snow coverage
Conference Title : ICEEE 2019 : International Conference on Environmental and Ecological Engineering
Conference Location : Buenos Aires, Argentina
Conference Dates : February 27-28, 2019