

## STUDY OF CHANGES IN LAND USE/COVER AT SHUI-TIAN VILLAGE

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**Abstract:** Shui-Tian village is located on a mountain with medium elevations in Hsichu County where a group of Atayal people live in. It has been a very good place to stay and hardly did any disaster happen for centuries. But, since some villagers rented their lands to outsiders who have developed the land illegally, the village has got worse and worse environment. It was very difficult for people to investigate those abused lands by walking around such a big mountain area. However, application of Formosat-2 images, Digital Elevation Model (DEM) and GIS data was a possible method to help the villagers to find out the change of land cover/use.

A summer image and a winter image of Formosat-2 satellite for the years of 2006, 2008 and 2010, six images in total, were selected for the preliminary study. Then, a summer and a winter image of year 2011, as well as a special image of 2012 have been collected to verify the results. The SaoLa typhoon hit the region of interest and the total rainfall was cumulated up to nearly 1000 mm on 1-2 August, 2012. The special image was taken after two months of the event. To identify the changes in land use, the nine images are normalized and converted into Normalized Difference Vegetation (NDVI) images. The NDVI difference images are generated by some pairs of NDVI images. At first, the bare lands can be identified from the NDVI difference image with an optimal threshold. By overlaying the GIS land use/cover classification data, and fine-tuning the threshold, we can get a better identification of land-use change areas. Finally, the changes ranges are determined by combined 3D simulated images.

The preliminary results shows that the two bare lands could be identified by comparing the summer and winter images in 2006. None can be identified by comparing the summer images between 2006 and 2008. On the other hand, two new

bare lands are identified by comparing the winter images between 2006 and 2008. Two more new bare lands are identified by comparing the summer images between 2008 and 2010. Another new bare land is identified by comparing the winter images between 2008 and 2010. The preliminary results have been presented at ACRS 2011.

Further study of lately two-year data reveals that the land use/cover has not clearly changed from 2010 to 2011. Even if the SaoLa typhoon hit Shui-Tian village with heavy rainfall in 2012, it is still not significantly changed in the land use/cover. The conclusion of the study is that the illegal land development was active during the years of 2006 and 2010, but was not broadened during the years of 2011 and 2012.

Keyword: Formosat-2 image, NDVI, Change of land use/cover