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Cross-calibration of AVHRR-MVISR and AVHRR-MODIS greenness data

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Monitoring the state of vegetation and yield estimation of some agricultural crops constitutes an important part in satellite-borne land surface investigations. In earlier studies we established a yield forecasting method based on low spatial resolution NOAA AVHRR (HRPT) satellite data.(Ferencz et al, 2004).

In this method we used the Greenness vegetation index, which is defined as the difference of reflectance of AVHRR channels 2 and 1. The setting up of a new satellite receiving station in 2002 provided a boost for further studies by ensuring a continuous data flow from several satellites. Data of other satellites has also become available, such as the 10-band data of the MVISR instrument of the Chinese FengYun satellites (CHRPT) and the 36-band data of the MODIS instruments, onboard of US satellites AQUA and TERRA. The latter ones are especially important since the spatial resolution of their first two channels is 250 m, which means a sixteen-fold increase in the amount of data relating to the same area in a single channel. To incorporate these data into the yield estimation methods, we had to find the relation between the quantitative surface parameters provided by the AVHRR, the MVISR and the MODIS instruments, most importantly the relations between their separated vegetation indices. This means the cross-calibration of these parameters and indices.

The first step was the cross-calibration of the GN vegetation indices. Two definitions have been introduced for the CHRPT-greenness of the FengYun satellites. The first is the usual one, namely the reflectance difference between the channels 2 and 1. The

second one was given as: $GN_{CHRPT} = (\rho_2 + \rho_{10})/2 - \rho_1$. To exploit the good spatial resolution of the MODIS data we compute here of the reflectance difference between the first two channels. We also defined other hyper-spectral GN indices losing the better spatial resolution there. The cross-calibration was successfully carried out for both the AVHRR-MVISR and AVHRR-MODIS relationships. Investigating the data over Hungary in 2005, the cross-calibrated GN data of all the three instruments follow the same curve, and so a common temporal series of data can be used in the yield estimation and other surface canopy investigations. Processing all the separate or the unified temporal series the result is essentially the same.

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Reference:

Cs. Ferencz, P. Bognár, J. Lichtenberger, D. Hamar, Gy. Tarcsai, G. Timár, G. Molnár, Sz, Pásztor, P. Steinbach, B. Székely, O.E. Ferencz and I. Ferencz-Árkos: Crop yield estimation by satellite remote sensing. Int. J. Rem. Sens., 25, 4113-4149, 2004.