Retrieval of aerosol optical thickness using multi-date and constant viewing angle images from Formosat-2 and VENµS.

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Usually, reflectance time series in the visible and near-infrared domain, such as those provided by SPOT satellites or by wide field of view instruments (VGT, MERIS, MODIS), are degraded by two main geophysical sources of noise : 1) atmospheric effects, mainly because of aerosol scattering, difficult to correct because aerosol optical properties are highly variable and difficult to characterise, and 2) directional effects, since the observed surface reflectances depend on solar and observation angles.

Since 2004, the Formosat-2 satellite, (and in the near future, the VENµS mission, see Dedieu et al, this conference) can provide very frequent high resolution images acquired with constant observation angles in the visible and near infrared. With these features, directional effects are considerably reduced, since only the solar angles vary slowly with time. Furthermore, the quasi absence of surface directional effects allow to improve atmospheric corrections by determining the aerosol properties. For this, we use the following properties:

- aerosol optical properties vary quickly with time but slowly with location.
- reflectances vary quickly with location but slowly with time, when there are no directional effects.

In a few days period, if a variation of the top of atmosphere (TOA) reflectance occurs, it is very likely to be due to variations of aerosol optical properties : it is thus possible to retrieve these properties from TOA reflectance variations. Such a method has been tested using Formosat-2 time series over 3 sites : images are being acquired every third day for two sites in France, every fourth day for a site in Morocco, with constant observation angles. AERONET sun photometers as well as in-situ surface reflectance measurements are available on both sites.

The method is providing quite good results for the optical thickness (standard deviations are below 0.1) and the surface reflectance time series obtained after atmospheric corrections are very smooth.