NEW EARTH OBSERVATION CAPABILITIES FOR SOLAR RADIATION ASSESSMENT

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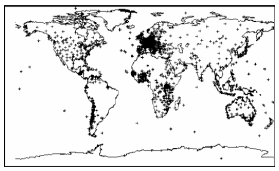
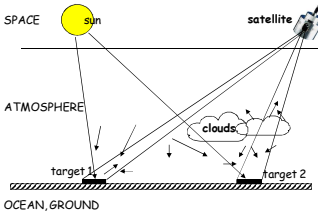
Ground measurements



World Radiometric Network. Sparse network, large gaps between stations

SATELLITE IMAGES

Inverse methods

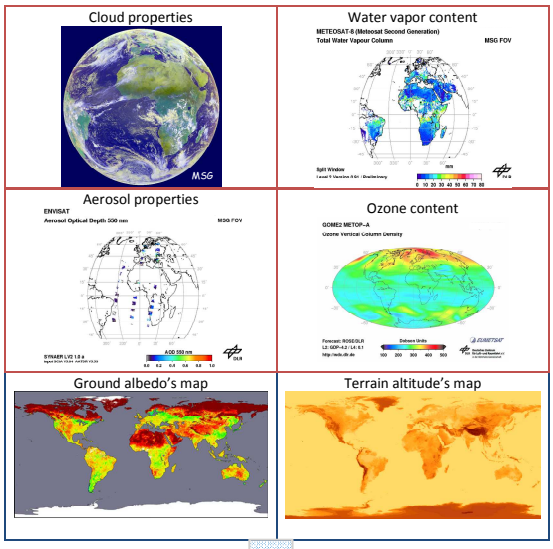


NEW SATELLITES

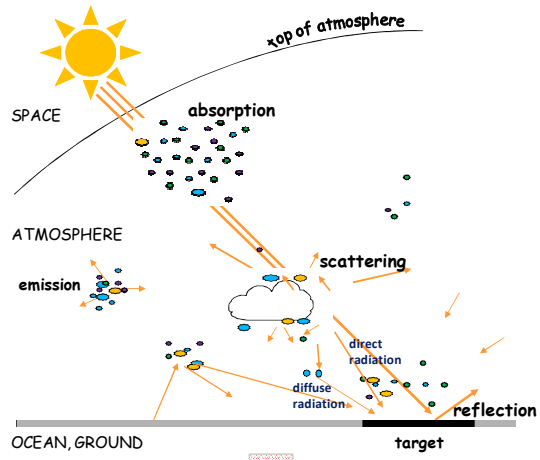
⇨ **possible direct method**

CHALLENGES

- ⇨ accurate description of the optical state of the atmosphere,
- ⇨ exploitation of all these values that are obtained at various time and space scales and sampling steps,
- ⇨ design of a radiative transfer algorithm fast enough to process every Meteosat images every 1/4 h.



Inputs: atmospheric parameters derived from satellite data



Modeling propagation of solar radiation

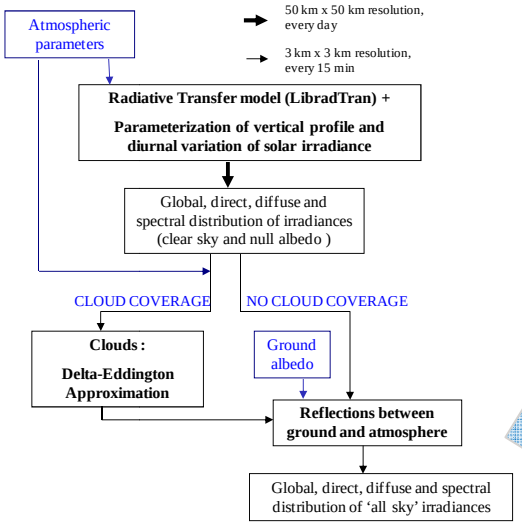
Radiative transfer equation

$$\mu\frac{dL(\tau,\mu,\varphi)}{d\tau} = L(\tau,\mu,\varphi) - \frac{\omega_0}{4\pi}e^{-\frac{\tau}{\mu_s}}p(\mu,\varphi,\mu_s,\varphi_s)E_s - \frac{\omega_0}{4\pi}\int_0^{2\pi}\int_{-1}^{1}p(\mu,\varphi,\mu',\varphi')L(\tau,\mu',\varphi')d\mu'd\varphi'$$

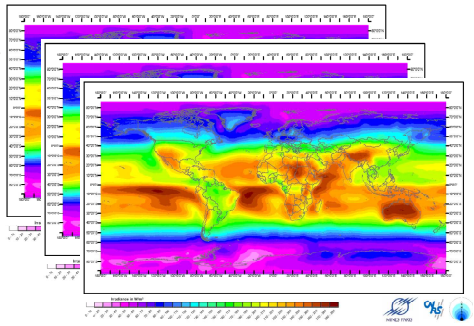
primary scattering

multiple scattering

The Heliosat-4 method



Irradiance maps



The main objective of my research is the assessment of SSI from satellite data including its spectral distribution. This assessment is based on radiative transfer models simulating the atmosphere. The atmospheric parameters (clouds, water vapour, aerosols, ozone) are obtained from new satellite data.