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ABSTRACT

In a context of climate change, it is fundamental to characterize and monitor accurately the Earth radiative budget at the top of atmosphere as well as at the surface. From measurements, a suitable assessment of radiative budget means obtaining precise solar and thermal radiative fluxes. The aim of this work consists to validate solar radiative fluxes obtained from the French satellite radiometer POLDER/PARASOL and to extent their determination towards thermal infrared domain.

The first part of the thesis will consist to compare POLDER solar fluxes with the reference ones acquired by the broadband radiometer CERES on board the NASA satellites AQUA and TERRA. The second part of the thesis will be devoted to extent the calculation towards thermal range in order to access to the net radiative budget corresponding to the sum of solar and thermal fluxes. This becomes possible through development of recent cloud products that give information about the cloud top altitude and cloud geometrical thickness, leading consequently quite easily to the cloud base altitude. The two first parameters are the properties required at first order to obtain upwelling thermal fluxes that can be compared and evaluated with the CERES ones. The cloud base height is necessary to obtain the downwelling fluxes and the net radiative budget at the surface.

These works will be based on POLDER/PARASOL radiometer measurements, available only until December 2013 but will be transferable to the future Multi-viewing, Multi-channel, Multi-polarisation Imager (3MI) developed by ESA and EUMETSAT and that will be part of the future EUMETSAT operational mission called EPS-SG and starting from 2021 for 20 years.