

## **Recent Validations of infrared and microwave forward models at LMD**

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To be successfully performed and understood, applications based on high spectral infrared sounders as well as microwave radiometers observations require rapid and accurate forward radiative transfer models. Accordingly, these models have to be regularly validated against auxiliary data, and, in particular, against collocated satellite-radiosonde observations.

Such models have been designed and maintained at LMD from the original line-by-line and layer-by-layer STRANSAC and 4A models to the hyper-fast 3R\_N based on a neural network approach. These models are involved in our applications, from the processing of TOVS to the processing of hyper spectral sounders e.g. AIRS/AMSU/Aqua and IASI/AMSU/Metop. For example, more than three years of AIRS/AMSU have already been processed.

Line by line model discrepancies or inaccuracy may find their origin in several sources: spectroscopic line parameters, minor gases cross section (temperature dependence), missing absorber, line coupling formulation including temperature dependence, exploration of the line wings, modeling of the continua, discretization in pressure and in frequency, etc.

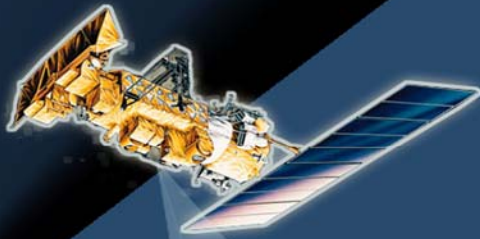
Here, we report on recent extensive validations performed in under several conditions of observations (downwelling, upwelling, limb) and for several types of instruments (radiometers, interferometers). Results will be presented and analyzed for campaigns as Thorpex, Equate, IASI balloon experiment, etc. Retroactions towards the spectroscopic database GEISA (line parameters, CFC's and aerosol description) will be also discussed.

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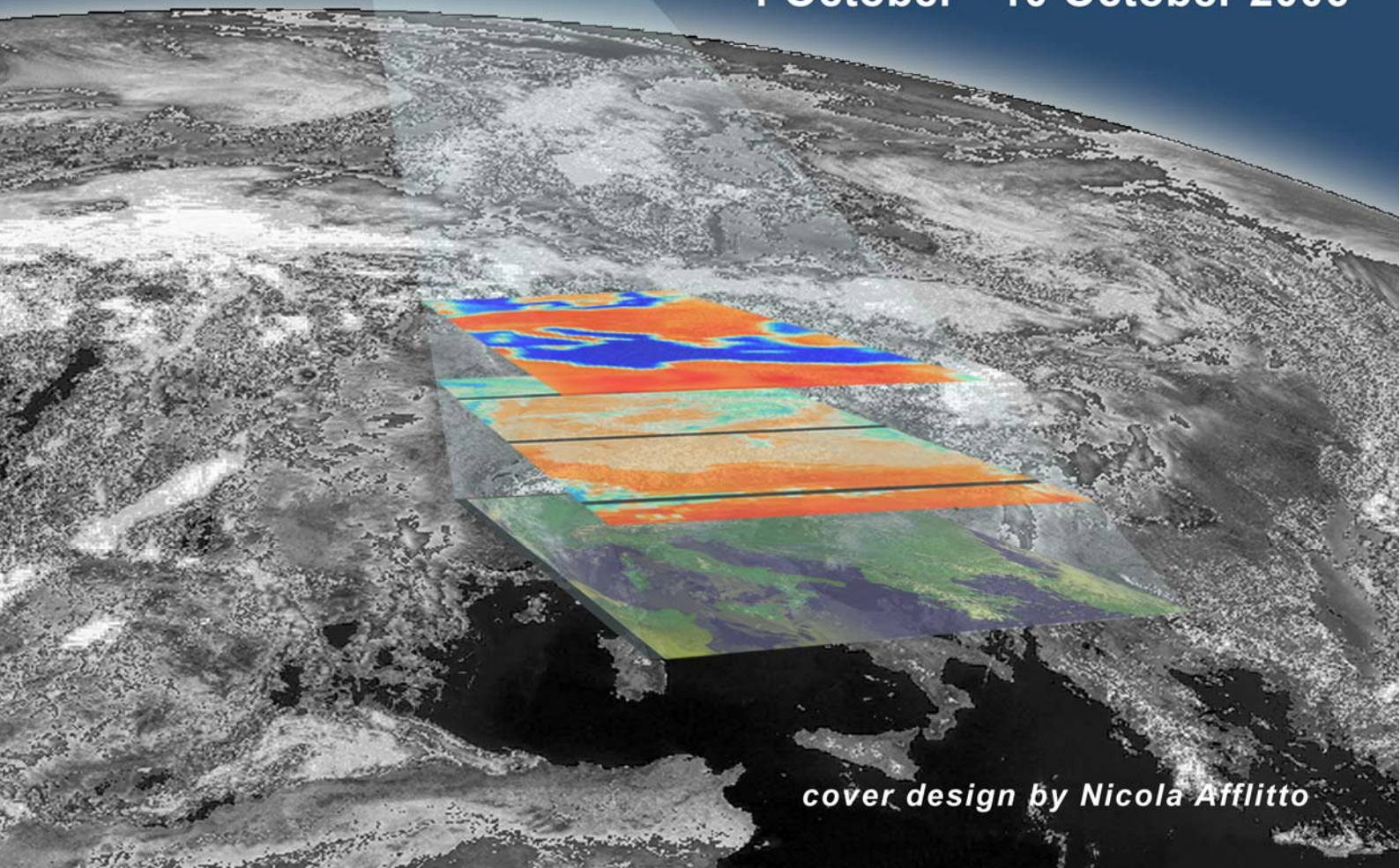
*using space-based observations*



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