

## ***CO2 Slicing Method for IASI***

**Arlindo Arriaga, Peter Schlüssel, Xavier Calbet, Thomas August,  
Olusoji Oduleye, Tim Hultberg**

Slicing Method for IASI Arlindo Arriaga, Peter Schlüssel, Xavier Calbet, Thomas August, Olusoji Oduleye, Tim Hultberg EUMETSAT, Am Kavalleriesand 31, 64297 Darmstadt, Germany

**ABSTRACT** The retrieval of the cloud top pressure and effective cloud amount within the fields of view of IASI is supported with the CO<sub>2</sub> slicing method, based upon its classical version with a fixed number of pre-selected sampling frequencies. A few tests are implemented in the respective algorithm to characterize the feasibility of its application to a particular situation, as well as to refine further the selection of sampling frequencies, to account for temperature inversions in the lower troposphere, and for quality control purposes. The thermodynamic structure of the atmosphere and the surface skin temperature are available as forecasts from ECMWF, and the model outgoing cloud free radiance is computed with the RTIASI-4. The surface emissivity is modelled either for a rough sea surface or for a land surface with different fractional land type coverage corresponding to the scene within the IASI IFOV. The pre-selection of a set of fixed sampling frequencies is performed with a simple methodology, whose application has been supported by two large data sets with a large variety of surface-atmosphere-clouds scenarios, covering the whole globe and all seasons of the year. The criterion to select such a set of frequencies for retrievals is based on a trade off between the accepted lowest significance of a pre-defined critical retrieval error and the accepted percentage of scenarios left as non-retrievable. The results achieved with the present algorithm are based upon a pre-selected set of 41 CO<sub>2</sub> sampling frequencies between 707.5 and 756.0 cm<sup>-1</sup>. The distribution of the retrieval error computed for realistic scenarios with multilevel ice or water clouds shows low bias (below 15 hPa) for cloud tops between 200 and 700 hPa, and respective cloud amounts not lower than 40%. The results achieved with a much larger data set of sampling frequencies have shown only marginal improvements. Broad results over different cloud fields have shown good spatial consistency with respect to co-located AVHRR images within the channels in the visible (0.6–0.9 μm) and infrared (10.8–12.5 μm) windows. The retrieval error is evaluated with cloud-radar measurements during an atmospheric sounding campaign at Lindenberg, Germany, from June to September 2007, in support of the validation of Metop products.

INTERNATIONAL  
**ATOVS**  
WORKING GROUP

*Proceedings of the  
Sixteenth International  
TOVS Study Conference*

Angra dos Reis, Brazil

7-13 May 2008

Sharing ideas, plans and  
techniques to study  
the earth's weather and climate  
using space-based observations

