Geophysical Research Abstracts
Vol. 12, EGU2010-5962-2, 2010
EGU General Assembly 2010

The GEISA Spectroscopic Database as a Tool for Hyperspectral Earth' Tropospheric Remote Sensing Applications

Nicole Jacquinet-Husson, Laurent Crépeau, Virginie Capelle, Noëlle Scott, Raymond Armante, and Alain Chédin
Ecole Polytechnique, Laboratoire de Météorologie Dynamique, Palaiseau Cedex, France (jacquinet@lmd.polytechnique.fr, +33-01.69.33.51.62)

Remote sensing of the terrestrial atmosphere has advanced significantly in recent years, and this has placed greater demands on the compilations in terms of accuracy, additional species, and spectral coverage. The successful performances of the new generation of hyperspectral Earth' atmospheric sounders like AIRS (Atmospheric Infrared Sounder -http://www-airs.jpl.nasa.gov/), in the USA, and IASI (Infrared Atmospheric Sounding Interferometer -http://earth-sciences.cnes.fr/IASI/) in Europe, which have a better vertical resolution and accuracy, compared to the previous satellite infrared vertical sounders, depend ultimately on the accuracy to which the spectroscopic parameters of the optically active gases are known, since they constitute an essential input to the forward radiative transfer models that are used to interpret their observations.
In this context, the GEISA (1) (Gestion et Etude des Informations Spectroscopiques Atmosphériques: Management and Study of Atmospheric Spectroscopic Information) computer-accessible database, initiated in 1976, is continuously developed and maintained at LMD (Laboratoire de Météorologie Dynamique, France). The updated 2009 edition of GEISA (GEISA-09)is a system comprising three independent sub-databases devoted respectively to: line transition parameters, infrared and ultraviolet/visible absorption cross-sections, microphysical and optical properties of atmospheric aerosols. In this edition, the contents of which will be summarized, 50 molecules are involved in the line transition parameters sub-database, including 111 isotopes, for a total of 3,807,997 entries, in the spectral range from 10-6 to 35,877.031 cm-1.
Currently, GEISA is involved in activities related to the assessment of the capabilities of IASI through the GEISA/IASI database derived from GEISA (2). Since the Metop (http://www.eumetsat.int) launch (October 19th 2006), GEISA/IASI is the reference spectroscopic database for the validation of the level-1 IASI data, using the 4A radiative transfer model (3) (4A/LMD http://ara.lmd.polytechnique.fr; 4A/OP co-developed by LMD and NOVELTIS -http://www.noveltis.fr/) with the support of CNES (2006).
Special emphasize will be given to the description of GEISA/IASI.
Spectroscopic parameters quality requirement will be discussed in the context of comparisons between observed or simulated Earth's atmosphere spectra.
GEISA and GEISA/IASI are implemented on the CNES/CNRS Ether Products and Services Centre WEB site (http://ether.ipsl.jussieu.fr), where all archived spectroscopic data can be handled through general and user friendly associated management software facilities. More than 350 researchers are registered for on line use of GEISA.
Refs:
(1) Jacquinet-Husson N., N.A. Scott, A. Chédin,L. Crépeau, R. Armante, V. Capelle, J. Orphal, A. Coustenis, C. Boonne, N. Poulet-Crovisier, et al. THE GEISA SPECTROSCOPIC DATABASE: Current and future archive for Earth and planetary atmosphere studies. JQSRT 109 (2008) 1043-1059.
(2) Jacquinet-Husson N., N.A. Scott, A. Chédin, K. Garceran, R. Armante, et al. The 2003 edition of the GEISA/IASI spectroscopic database. JQSRT 95 (2005)429-467.
(3) Scott, N.A. and A. Chedin. A fast line-by-line method for atmospheric absorption computations: The Automatized Atmospheric Absorption Atlas. J. Appl. Meteor. 20 (1981)556-564.