



Adjusted Levenberg-Marquardt method application to methene retrieval from IASI/METOP spectra

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ADJUSTED LEVENBERG-MARQUARDT METHOD APPLICATION TO METHANE RETRIEVAL FROM IASI/METOP SPECTRA

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Levenberg-Marquardt method [1] with iteratively adjusted parameter and simultaneous evaluation of averaging kernels together with technique of parameters selection are developed and applied to the retrieval of methane vertical profiles in the atmosphere from IASI/METOP spectra. Retrieved methane vertical profiles are then used for calculation of total atmospheric column amount. NCEP/NCAR reanalysis data provided by ESRL (NOAA, Boulder, USA) [2] are taken as initial guess for retrieval algorithm. Surface temperature, temperature and humidity vertical profiles are retrieved before methane vertical profile retrieval for each selected spectrum. Modified software package FIRE-ARMS [3] were used for numerical experiments. To adjust parameters and validate the method we used ECMWF MACC reanalysis data [4]. Methane columnar values retrieved from cloudless IASI spectra demonstrate good agreement with MACC columnar values. Comparison is performed for IASI spectra measured in May of 2012 over Western Siberia. Application of the method for current IASI/METOP measurements are discussed.

1. Ma C., Jiang L. Some Research on Levenberg-Marquardt Method for the Nonlinear Equations // Applied Mathematics and Computation. 2007. V.184. P. 1032–1040

2. <http://www.esrl.noaa.gov/psd><http://www.esrl.noaa.gov/psd>

3. Gribanov K.G., Zakharov V.I., Tashkun S.A., Tyuterev V.I.G.. A New Software Tool for Radiative Transfer Calculations and its application to IMG/ADEOS data // JQSRT.2001.V.68.№ 4. P. 435-451.

4. <http://www.ecmwf.int/http://www.ecmwf.int>