Geophysical Research Abstracts
Vol. 14, EGU2012-10833, 2012
EGU General Assembly 2012

The ESA Cloud CCI project: Generation of Multi Sensor consistent Cloud Properties with an Optimal Estimation Based Retrieval Algorithm

M Jerg (1), M Stengel (1), R Hollmann (1), C Poulsen (2), and the ESA CCI Cloud Team
(1) Deutscher Wetterdienst, (2) Rutherford Appleton Laboratory

The ultimate objective of the ESA Climate Change Initiative (CCI) Cloud project is to provide long-term coherent cloud property data sets exploiting and improving on the synergetic capabilities of past, existing, and upcoming European and American satellite missions. The synergetic approach allows not only for improved accuracy and extended temporal and spatial sampling of retrieved cloud properties better than those provided by single instruments alone but potentially also for improved (inter-)calibration and enhanced homogeneity and stability of the derived time series. Such advances are required by the scientific community to facilitate further progress in satellite-based climate monitoring, which leads to a better understanding of climate. Some of the primary objectives of ESA Cloud CCI Cloud are (1) the development of inter-calibrated radiance data sets, so called Fundamental Climate Data Records – for ESA and non ESA instruments through an international collaboration, (2) the development of an optimal estimation based retrieval framework for cloud related essential climate variables like cloud cover, cloud top height and temperature, liquid and ice water path, and (3) the development of two multi-annual global data sets for the mentioned cloud properties including uncertainty estimates. These two data sets are characterized by different combinations of satellite systems: the AVHRR heritage product comprising (A)ATSR, AVHRR and MODIS and the novel (A)ATSR – MERIS product which is based on a synergetic retrieval using both instruments. Both datasets cover the years 2007-2009 in the first project phase. ESA Cloud CCI will also carry out a comprehensive validation of the cloud property products and provide a common data base as in the framework of the Global Energy and Water Cycle Experiment (GEWEX).

The presentation will give an overview of the ESA Cloud CCI project and its goals and approaches and then continue with results from the Round Robin algorithm comparison exercise carried out at the beginning of the project which included three algorithms. The purpose of the exercise was to assess and compare existing cloud retrieval algorithms in order to chose one of them as backbone of the retrieval system and also identify areas of potential improvement and general strengths and weaknesses of the algorithm. Furthermore the presentation will elaborate on the optimal estimation algorithm subsequently chosen to derive the heritage product and which is presently further developed and will be employed for the AVHRR heritage product. The algorithm's capabilities to coherently and simultaneously process all radiative input and yield retrieval parameters together with associated uncertainty estimates will be presented together with first results for the heritage product. In the course of the project the algorithm is being developed into a freely and publicly available community retrieval system for interested scientists.