Geophysical Research Abstracts, Vol. 7, 05600, 2005
SRef-ID: 1607-7962/gra/EGU05-A-05600

Progress in planning for frequent observation of precipitation from geostationary orbit by millimetre-submillimetre-wave radiometry

B. Bizzarri (1), A. Gasiewski (2), A. Mugnai (1) and D. Staelin (3)

(1) CNR Istituto di Scienze dell'Atmosfera e del Clima, Bologna/Roma, Italy, (2) NOAA Environmental Technology Laboratory, Boulder Co., USA, (3) MIT Research Laboratory of Electronics, Cambridge MA., USA.

bibizzar@tin.it / Fax: +39.06.4423.7615 / Phone: +39.06.4426.1604

The concept of observing precipitation from geostationary orbit by means of millimetre-submillimetre-wave radiometry is being pursued since several years. At the EGS XXVII General Assembly in 2002 information was provided on the American GEM (Geostationary Microwave observatory) and the European GOMAS (Geostationary Observatory for Microwave Atmospheric Sounding) projects. Since then, there has been considerable progress in the documentation of the requirements, the consolidation of the principle, the demonstration of the potential capabilities and, most important, the definition of a strategy to implement a demonstration mission by means of international cooperation.

As for the requirements, the interest of the operational hydrological community for using satellite data in support of flood forecasting is growing rapidly. For instance, in Europe, under pressure from its Member and Cooperating States, EUMETSAT is establishing a "Satellite Application Facility in support of Operational Hydrology and Water Management" (H-SAF). Preparing for this, it was clear that, although important applications are possible today on the base of existing operational systems and will be improved with the advent of the GPM mission, measurements as frequent as required for accurate computation of cumulate precipitation will have to wait for the advent of microwave in GEO.

On the challenging aspect of understanding and modelling the relationship between cloud and precipitation as impacting radiation at these ice-controlled frequencies, con-

siderable progress has been made, both by means of simulations and on the base of experimental data, to the extent that there is the feeling that enough evidence has been collected on the soundness of the physical principle. However, considerable effort is still needed if physical retrieval algorithms have to be used.

On the technological side, Europe (ESA) has probably filled the gap with the USA, since a number of industrial studies have been run and are running, first on scenarios, then at instrument level and now at critical technology level. This efforts add to the continuing effort in the USA.

Meanwhile, a new initiative has been taken in the framework of the Coordination Group for Meteorological Satellites (CGMS) and the WMO Space Programme for implementing demonstration missions in the geostationary orbit. IGeoLab (International Geostationary Laboratory) is intended to fill the gap of technology development in GEO, traditionally blocked by the built-in strong operational characterisation of regional-driven geostationary satellites and the fact that platform resources are saturated by the main operational missions (VIS/IR imagery and IR sounding). IGeoLab missions are conceived to be mono-payload, possibly small, and flexible as concerns the operations plans when in orbit (i.e., migrating along the equator to serve more areas).

Two missions have been selected as testbeds: one close to be “ready”, for a risk reduction purpose (GIFTS, Geostationary Infrared Fourier Transform Spectrometer), the other, GOMAS, as an example of end-to-end long-term development. The WMO is in charge of promoting the IGeoLab concept, whereas CGMS members (that include R&D space agencies) should cooperate for implementation. The challenge is how to conciliate the need for cooperative projects with the mission selection mechanisms adopted by ESA (Earth Explorers) and NASA (Earth System Science Pathfinder). This will be experienced very soon with the new Calls for Ideas being issued by ESA and NASA.

The presentation will touch all these items and elaborate on the synergy between frequent GEO observation and the GPM mission, that invites to consider the opportunity to have the GOMAS demonstration mission performed at the time of the “core” GPM satellite.