Geophysical Research Abstracts, Vol. 8, 07108, 2006
SRef-ID:

Presentation and Validation of the Inter-tropical Neural Downscaling Rainfall Algorithm (INDRA) over West Africa

F. Chopin (1), J.C. Bergès (2), M. Desbois (1), A. Ali (3), A. Amani (3)

(1) LMD, IPSL/CNRS, Ecole Polytechnique 91128 Palaiseau, France, (2) PRODIG, Université Paris 1, Paris, France, (3) Centre AGRHYMET, Niamey, Niger(chopin@lmd.polytechnique.fr / Phone: +33 1 69 33 36 02)

Rainfall estimates are crucial for hydrologists and climatologists in order to study the water cycle. Famine, early warning system, large locust swarms invasions and flood monitoring, require continuous rainfall information at a scale as fine as possible.

Meteorological satellites are the only way to obtain repeated rainfall estimations in a major part of the world. Over land, only the richest countries are managing ground radars and raingauges networks dense enough for an operational survey and, over oceans, meteorological boats and buoys dedicated to rainfall measurement are not numerous enough.

To be as robust as possible, most of recent satellite precipitation algorithms are combining as many data sources as possible: microwave data from LEO satellites, infrared data from GEO satellites and ground data provided by radars or raingauges. However, a satellite rainfall algorithm must be validated with ground data to verify that the associated results are valuable for the final user. In a same way, the space and time resolution of the final product must be adapted to the user needs.

The Inter-tropical Neural Downscaling Rainfall Algorithm (INDRA) developed within the framework of AMMA combines MSG, TRMM precipitation radar (PR) and GPCP1-dd data. Firstly MSG data are "calibrated" in term of rainfall probability from coinciding TRMM-PR data through a feed forward neural network. A "rainfall probability map" is then produced for each MSG image. Secondly, using a rescaling formula, GPCP1dd information is merged with these probabilities in order to estimate

precipitations. This is a way to introduce the finest details of the MSG multi-spectral information into the GPCP1dd product. The INDRA final product is provided with the MSG space/time resolution (3 kilometers and 15 minutes) in order to be integrated in accordance to the final user requirements.

These rainfall estimates have been validated over the CILSS countries with krigged raingauge data provided by AGRHYMET and IRD during the 2004 rainy season, for dekades and three different spatial scales (0.5°,1° and 2,5°). They have been compared with classical GPCP1dd dekade estimations and give better results according with the ground validation dataset.

INDRA is involved in a satellite rainfall algorithms inter-comparison exercise over West Africa within the PrecipAMMA group supervised by AGRHYMET.