



## **Merging satellite precipitation and bias-corrected rain gauge measurements on a daily base**

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### **1 Introduction**

Within the framework of geoland, a FP6 Integrated Project designed to fundamentally support the GMES initiative, focusing on the priorities “Land Cover Change in Europe”, “Environmental Stress in Europe”, and “Global Vegetation Monitoring”, a global scale daily precipitation product will be developed. GMES is a joint initiative of European Commission (EC) and European Space Agency (ESA), which aims to build up a European capacity for Global Monitoring of Environment and Security by the year 2008. Goal is to provide daily precipitation fields on a global regular  $1^\circ$  longitude/latitude grid due to an improvement of existing multi-satellite products by merging with bias-corrected rain gauge analyses. Currently there does exist no operational global daily precipitation product which is based on bias-corrected gauge analyses.

### **2 Data and Method**

Global daily  $1^\circ$  multi-satellite estimates of precipitation, the GPCP-1DD product [1], have been archived for the period January 1997 to December 2003. This product is a combination of different satellite products, infrared estimates from geostationary satellites and rain estimates based on TOVS data from polar orbiting satellites. Global daily bias-corrected rain gauge data based on about 6 000 synoptic stations have been collected for the same period. The bias-correction of the ground based precipitation

measurements is needed because of the under-catch of operational rain gauges. This under-catch is of the order of 5-30 % on average [2]. Both datasets have been merged by well known and commonly used kriging and cokriging methods.

### 3 Results

A first version of this combined precipitation product has been calculated and validated for the year 2000. For verification purposes non-synoptic dense precipitation measurements based on about 21 000 stations over the ELDAS domain [3] were used. As the accuracy of the existing multi-satellite estimates of precipitation over Europe is well known (in terms of objective verification scores), a quality improvement of about 10 % can be shown.

### References

- [1] Huffman, G.J., R.F. Adler, M.M. Morrissey, S. Curtis, R. Joyce, B. McGavock, and J. Susskind, 2001: Global precipitation at one-degree daily resolution from multi-satellite observations. *J. Hydrometeor.*, **2**, 36-50.
- [2] Ungersböck, M., F. Rubel, T. Fuchs and B. Rudolf, 2001: Bias correction of global daily rain gauge measurements. *Phys. Chem. Earth (B)*, **26**, 411-414.
- [3] Rubel, F., 2004: A new European precipitation dataset for NWP model verification and data assimilation studies. In: Cote, J. (Ed.) Research Activities in Atmospheric and Oceanic Modelling, *WMO/TD No. 1220*, Report No. 34, Section 2, 11-12