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Co-kriging global daily rain gauge and satellite data

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Global daily precipitation analyses are mainly based on satellite estimates, often calibrated with monthly ground analyses or merged with model predictions. We argue here that an essential improvement of their accuracy is only possible by incorporation of daily ground measurements.

Here we present geostatistical methods to compile a global precipitation product based on daily rain gauge measurements. The raw ground measurements, disseminated via GTS, are corrected for their systematic measurement errors [1] and interpolated onto a global 1 degree grid [2]. For interpolation ordinary block kriging is applied, with precalculated spatial auto-correlation functions (ACFs). This technique allows to incorporate additional climate information. First, monthly ACFs are calculated from the daily data; second, they are regionalised according to the 5 main climatic zones of an updated Köppen-Geiger climate classification [3], provided at *http://koeppen-geiger.vu-wien.ac.at*. The interpolation error, a by-product of kriging, is used to flag grid points as missing if the error is above a predefined threshold. But for many applications missing values constitute a problem. Due to a combination of the ground analyses with the daily multi-satellite product of the Global Precipitation Climatology Project (GPCP-1DD) not only these missing values are replaced but also the spatial structure of the satellite estimates is considered. As merging method bivariate ordinary co-kriging is applied. The ACFs necessary for the gauge and the satellite fields as well as the corresponding spatial cross-correlation functions (CCFs) are again precalculated for each of the 5 main climatic zones and for each individual month.

As a result two new global daily data sets for the period 1996 to present will be avail-

able on the Internet (*http://precipitation.vu-wien.ac.at*): A precipitation product over land, analysed from ground measurements; and a global precipitation product merged from this and the GPCP-1DD multi-satellite product. Both products show a significant improvement in terms of verification scores, compared to the original multi-satellite product. For example, the verification over the entire European Union results in a rank-order correlation coefficient which increases from 0.49 (GPCP-1DD) to 0.86 (merged product). The true skill score (TSS) increases from 0.36 (GPCP-1DD) to 0.67 (merged product). Detailed verification results over Europe, East Asia and Australia will be presented in [4].

References

[1] 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.

[2] Kottek, M., and F. Rubel, 2007: Global daily precipitation fields from bias-corrected rain gauge and satellite observations. Part I: Design and development. *Meteorol. Z.*, **16**, 525-539.

[3] Kottek, M., J. Grieser, C. Beck, B. Rudolf, and F. Rubel, 2006: World map of Koeppen-Geiger climate classifcation updated. *Meteorol. Z.*, **15**, 259-263.

[4] Rubel, F., and M. Kottek, 2008: Global daily precipitation fields from bias-corrected rain gauge and satellite observations. Part II: Verification results. *Meteorol. Z.*, in preparation.