



## **Discontinuous daily temperatures in the WATCH forcing data sets**

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The WATCH forcing data sets have been created to support the use of hydrological and land surface models for the assessment of the water cycle within climate change studies. They are based on ECMWF reanalysis products (ERA-40 or ERA-Interim) with temperature (among other variables) adjusted such that their monthly means match the monthly temperature data set from the Climatic Research Unit. To this end, daily minimum, maximum and mean temperatures within one calendar month have been subjected to a correction involving monthly means of the respective month. As these corrections can be largely different for adjacent months this procedure is potentially leading to unplausible differences in daily temperatures across the boundaries of calendar months. We analyze day-to-day temperature fluctuations within and across months and find that across months differences are significantly larger, mostly in the tropics and frigid zones. Average across-months differences in daily mean temperature are typically between 10% to 40% larger than their corresponding average within-months temperature differences. However, regions with differences up to 200% can be found in the tropical Africa. Daily maximum and minimum temperatures are affected in the same regions but in a less severe way.