



Diurnal temperature cycle deduced from extreme daily temperatures and impact over a surface reanalysis system

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Due to the evolution of the observation network density, temporal inhomogeneities in reanalysis may appear. In France a big gap in the hourly 2m-temperature observation network occurred in the early 1990's related to the automatic station deployment. Before 1990 about 200 hourly temperature observations are available for analysis systems whereas at the end of the 1990's this number reaches 1500. As a consequence the hourly 2m-temperature analysis performed by the system SAFRAN using hourly temperatures shows inhomogeneities compared to homogenised long-term series. This observation network gap is not present for extreme daily temperatures observations. In order to reduce inhomogeneities and enable a climatological use of temperature analysis, information from extreme temperatures could be helpful.

To address this problem, diurnal temperature cycle has been reconstructed at stations which only records extreme temperatures. These new "pseudo" hourly temperatures observations are then provided to the analysis system. Two methods are tested to determine hourly temperatures from extremes, the first one add information coming from the geographic characteristics of the station. The second one use hourly temperature observations available in the neighbourhood.

After the description and the evaluation of the methods of reconstruction, the impact of the new hourly data on the temperature analysis will be discussed. Some prospects will be proposed to conclude.