

EGU2020-1397

<https://doi.org/10.5194/egusphere-egu2020-1397>

EGU General Assembly 2020

© Author(s) 2022. This work is distributed under the Creative Commons Attribution 4.0 License.



Automation of the interactive mode of the homogenisation software HOMER for climatological applications

Magnus Joelsson¹, Nils Slättberg², Alicia Carnebring³, Christophe Sturm¹, and Erik Engström¹

¹SMHI, Information och statistik, Norrköping, Sweden (magnus.joelsson@smhi.se)

²Department of Earth Sciences, University of Gothenburg, Gothenburg, Sweden

³Statistics and Data Analysis, Linköping University, Linköping, Sweden

The homogenisation software HOMER has proven to be a reliable tool for the homogenisation of temperature and precipitation observation series. The homogenisation with HOMER requires the interaction of an operator, which makes the procedure time consuming, sensitive to arbitrary choices or error by the operator, and difficult to reproduce.

HOMER uses three methods for the detection of homogeneity breaks: A pairwise comparison method (PRODIGE) for break detection on annual, seasonal or monthly basis, a two-factor model for joint-detection (ANOVA), and an ACMANT style method for the detection of homogeneity breaks in the amplitude of the seasonal cycle. The operator reviews the results of the different methods and confirms or rejects suggested breaks. HOMER can also be run in a automatic mode, where all suggested breaks from the joint-detection and the ACMANT style detection methods are confirmed and all suggested breaks from the pairwise method are rejected. Note, that also the automatic mode of HOMER requires some interactions, such that nor this mode is suitable for batch processing.

The homogenisation with HOMER of temperature observations at SMHI has previously been performed with a set of criteria for the confirmation of a suggested homogeneity break. These criteria has been implemented in the HOMER (interactive mode) source code by assigning the break signals from the methods different weights and applying a threshold for the sum of the weighted break signals each year for the confirmation of a break year. The user can chose to adjust these threshold and weights to fit their needs. All user interactions are removed to enable batch processing.

The new automatic mode of HOMER are applied on the synthetic benchmark data set INDECIS and to Swedish observational data from 80 coupled weather stations over the time period from 1860 to 2018. For the INDECIS data set, the positions of the breaks are known and a corresponding data set without breaks are available. Current default settings and settings optimised to minimise the deviation of the homogenised data from the INDECIS clean data are used. The results are compared with results of the interactive and standard automatic mode of HOMER, and other state-of-art homogenisation tools along with known potential homogeneity breaks from meta data.

