Geophysical Research Abstracts
Vol. 17, EGU2015-15502, 2015
EGU General Assembly 2015

An application of HOMER and ACMANT for homogenising monthly precipitation records in Ireland

John Coll (1), Mary Curley (2), Peter Domonkos (3), Enric Aguilar (3), Seamus Walsh (2), and John Sweeney (1)

(1) Irish Climate Analysis and Research Units, Department of Geography, Maynooth University, Maynooth, Ireland., (2) Met Éireann, Glasnevin Hill, Dublin 9, Ireland., (3) Center for Climate Change, C3, University Rovira i Virgili, Spain.

Climate change studies based only on raw long-term data are potentially flawed due to the many breaks introduced from non-climatic sources. Consequently, accurate climate data is an essential prerequisite for basing climate related decision making on; and quality controlled, homogenised climate data are becoming integral to European Union Member State efforts to deliver climate services. Ireland has a good repository of monthly precipitation data at approximately 1900 locations stored in the Met Éireann database. The record length at individual precipitation stations varies greatly. However, an audit of the data established the continuous record length at each station and the number of missing months, and based on this two initial subsets of station series (n = 88 and n = 110) were identified for preliminary homogenisation efforts.

The HOMER joint detection algorithm was applied to the combined network of these 198 longer station series on an Ireland-wide basis where contiguous intact monthly records ranged from ∼40 to 71 years (1941 – 2010). HOMER detected 91 breaks in total in the country-wide series analysis distributed across 63 (∼32%) of the 71 year series records analysed. In a separate approach, four sub-series clusters (n = 38 – 61) for the 1950 - 2010 period were used in a parallel analysis applying both ACMANT and HOMER to a regionalised split of the 198 series. By comparison ACMANT detected a considerably higher number of breaks across the four regional series clusters, 238 distributed across 123 (∼62%) of the 61 year series records analysed.

These preliminary results indicate a relatively high proportion of detected breaks in the series, a situation not generally reflected in observed later 20th century precipitation records across Europe (Domonkos, 2014). However, this elevated ratio of series with detected breaks (∼32% in HOMER and ∼62% in ACMANT) parallels the break detection rate in a recent analysis of series in the Netherlands (Buishand et al 2013). In the case of Ireland, the climate is even more markedly maritime than that of the Netherlands and the spatial correlations between the Irish series are high (>0.8). Therefore it is likely that both HOMER and ACMANT are detecting relatively small breaks in the series; e.g. the overall range of correction amplitudes derived by HOMER were small and only applied to sections of the corrected series. As Ireland has a relatively dense network of highly correlated station series, we anticipate continued high detection rates as the analysis is extended to incorporate a greater number of station series, and that the ongoing work will quantify the extent of any breaks in Ireland's monthly precipitation series.

KEY WORDS: Ireland, precipitation, time series, homogenisation, HOMER, ACMANT.

References

Buishand, T.A., DeMartino, G., Spreeuw, J.N., Brandsma, T. (2013). Homogeneity of precipitation series in the Netherlands and their trends in the past century. International Journal of Climatology. 33:815–833

Domonkos, P. (2014). Homogenisation of precipitation time series with ACMANT. Theoretical and Applied Climatology. 118:1-2. DOI 10.1007/s00704-014-1298-5.