TIN-Copula bias correction of modeled daily maximum temperature in the MENA region
G. Lazoglou (g.lazoglou@cyi.ac.cy), G. Zittis, P. Hadjinicolaou, and J. Lelieveld

1. **Aim:** Minimization of the biases between the maximum temperature simulated by a global and a regional climate model, based on the ERA5 reanalysis data.

2. **Data:**
   - Parameter: Maximum Temperature (daily)
   - ERA5 reanalysis data. (0.25°×0.25°)
   - Hadley Centre Global Environmental Model version 3 (HadGEM3). (0.8°×0.5°)
   - Weather Research and Forecasting model (WRF) (0.44°×0.44°)

3. **Methodology:** The TIN-Copula method is a combination of Triangular Irregular Networks (TINs) and Copulas

   - Formation of TINs - network with non-overlapping triangles, covering the area of study. (a)
   - Identification of the triangle, includes the x-point. (b)
   - Calculation of a new data set at the x-point, using the Wn index values with the reanalysis data (from the calibration period).
   - Use of the data set destined for bias correction, as input in conditional form of the selected copula.
   - Use of Copulas for calculating the mathematical function, describing the dependence of the two available data sets at the x-point.

4. **Results:**
   - (a) ERA5
   - (b) Diff HadGEM3-ERA5

5. **Conclusions:** TIN-Copula has the ability to increase the accuracy of the simulated data during all seasons and most of the studied area, independent from topographical features, the magnitude of the initial bias and the used model.

Acknowledgements: This research supported by the EMME-CARE project that has received funding from the European Union’s Horizon 2020 Research and Innovation Programme, under Grant Agreement No. 856612, as well as matching co-funding by the Government of the Republic of Cyprus.