**21.9.2023 SL**

**Population-weighted daily mean temperature series for districts in Sweden**

**Output**

* District-level (~2500 districts) daily mean temperature, 1969 to present
* ~2500 districts

**Required inputs**

* Temperature: daily mean temperature, 2.5\*2.5km, 1969 to present; Swedish Met Office.
* Land-sea mask for Sweden (to identify temperature cells over land).
* Population: total popn count, 1\*1km, year? (2022?); [Stats Sweden](https://www.scb.se/en/services/open-data-api/open-geodata/grid-statistics).
* Parish/district shapefiles

The times in the files for the different years differ:

1961-1967: analyses at 00, 06, 12, 18 UTC

1968-1996: analyses at 00, 03, 06, 09, 12, 15, 18, 21 UTC

1997- 2018: analyses at every hour. One could use the 00, 06, 12 and 18 analyses for consistency.

The land-sea mask is included in the file sftlf\_NORDIC-3\_SMHI-UERRA-Harmonie\_RegRean\_v1\_Gridpp\_v1.0.1\_fx.nc as the percentage land fractions. The file orog\_NORDIC-3\_SMHI-UERRA-Harmonie\_RegRean\_v1\_Gridpp\_v1.0.1\_fx.nc holds the cell mean altitude.

Here is the file for the 1 km population grid for 2022. Considering the slow growth rate of the Swedish population, we think that it is reasonable to apply this also from 1970s.

<https://www.scb.se/en/services/open-data-api/open-geodata/grid-statistics/>

**Methods**

Parish-district discontinuity

In 2005, shift from parish to district; overlap is 98%. Two options:

* Use district boundaries to create a single series for 1969-
* Use parish borders 1969-2004 and district borders from 2005- to create two series.

The first option (i.e. use most recent boundaries) is being used for Early Adapt European data and seems reasonable for Sweden (One way of dealing with this might be to exclude areas where overlap is less than some threshold (e.g. 95%) from analyses). OK?

(Note: districts comprised of two or more discontinuous areas will assigned a single temperature series)

Matching cells

Temperature, population and districts will be joined according to percent overlap (better than using centroids, esp for small areas). Where population cells intersect with the coastline, the fraction of the cell falling in the sea will be rescued and included in the calculations. It´s possible that some coastal population cells won´t intersect with an overland temperature cell: the usual procedure has been to exclude these population cells; we could check the potential influence of this, though