

## HadISDH.land Update Document

Kate Willett (MOHC), 7<sup>th</sup> April 2020

### General Notes:

The HadISDH.land.v4.2.0.2019f contains all 12 months of 2019. It is a minor new version (Y element + 1) because some of the code base has been changed from IDL to Python 3 and from Python 2.7 to Python 3. All other processing steps for HadISDH.land remain identical. The new version of HadISD (3.1.0.2019f) has pulled through some historical changes to stations which are passed on to HadISDH.land. This, 36 extra initial stations and the additional year of data results in small changes to station selection. There have been several bugs found and fixed during the code conversion which are documented below which have also led to some small changes in regional and global average values and coverage. This is rolled into the minor increment of Y from 1 to 2 rather than also incrementing the Z element. The homogeneity adjustments differ slightly due to sensitivity to the addition and loss of stations, historical changes to stations previously included and the additional 12 months of data. More information can be found at <https://hadisdh.blogspot.com/2020/04/2019-update-to-v4202019f.html>.

### Version Number X.Y.Z.0000p/f:

4.2.0.2019f

### Major Changes X:

- None

### Minor Changes Y:

- All processing steps for HadISDH.land remain identical but much of the code is now written in Python 3 rather than IDL and Python 2.7.

### Bug fixes / historical data updates Z:

- Retrospective improvements to the historical data in the ISD archive are ongoing and have been incorporated here where stations appear in previous versions and this new HadISDH.land version. These have not been documented.
- We note a drop out of data for April 2015 across much of the globe. This issue has not yet been resolved.
- There has been a small increase in the number of stations selected to process for HadISDH.land (not all of these make it through to the final processed product) from 8103 in the previous version to 8139 in this version.
- Bug fix 1: Incorrect reshaping of 20CR climatological array so climatological pressures used to obtain climatological station pressure were wrong. This had a very small affect on values.
- Bug fix 2: RH when  $T_w \leq 0$  was being calculated relative to a wet bulb rather than an ice bulb.
- Bug fix 3: The monthly averaging was kicking out data with 15 years of observations within the climatology whereas we keep this data ( $\geq 15$  rather than  $>15$ )
- Bug fix 4: The decade check for climatology was incorrect in IDL such that stations were passing through when they had no data in the 1981-1990 period.
- Bug fix 5: Output gridded uncertainties were stated to be 1 sigma but were in fact a mix of 2 and 4 sigma. These are now all 2 sigma, as originally intended.

Given the Minor Change Y above we have not incremented a Change Z.

**Start Date DD.MM.YYYY:** 1973-01-01

**End Date DD.MM.YYYY:** 2019-12-31

**Hadisdh Data Format (Baseline documentation):** Updated to include marine and blend data and

correct the uncertainty to state 2 sigma uncertainties – URL: <http://cedadocs.ceda.ac.uk/1477>

**Reference:** No change

**Other notes:** The update blog post is here: <https://hadisdh.blogspot.com/2020/04/2019-update-to-v4202019f.html>