

Table S1 Shows the data sources and the number of daily stations with location issues per source.

| No. | Data Source Name | No. of Stations |
|-----|--|-----------------|
| 1 | Data originated from NCDC's Global Summary of the Day (GSOD) Product | 2506 |
| 2 | Global Historical Climate Network Dataset | 1649 |
| 3 | The European Climate Assessment and Dataset | 881 |
| 4 | South Asia Climate Assessment Dataset | 442 |
| 5 | UK Met office | 421 |
| 6 | Environment Canada National Climate Data and Information Archive | 318 |
| 7 | Marcus Flarup | 235 |
| 8 | National Climate Centre Bureau of Meteorology PO Box 1289K Melbourne | 222 |
| 9 | Blair Trewin | 186 |
| 10 | Pauli Jokinen | 125 |
| 11 | Eirik Forland | 100 |
| 12 | Albert Klein Tank | 93 |
| 13 | Claus Kern-Hansen | 76 |
| 14 | These data originated from the Japan Meteorological Agency | 66 |
| 15 | Antarctic Meteorological Research Center (AMRC) University Wisconsin | 65 |
| 16 | Vyacheslav Razuvaev | 63 |
| 17 | The Southeast Asian Climate Assessment and Dataset | 60 |
| 18 | Dr. Ir. Wanny K. Adidarma | 56 |
| 19 | Dr V.N. Razuvaev and Dr. O.N. Bulygina Oak Ridge National laboratory, USA | 50 |
| 20 | JAMSTEC digitization project | 43 |
| 21 | William Angel AS part of the CDMP program | 42 |
| 22 | GSN network | 33 |
| 23 | Antonio Mestre Barcelo | 31 |
| 24 | National Climate Data Center (DWD) | 28 |
| 25 | Olga Zolina | 20 |
| 26 | Marc Prohom | 16 |
| 27 | National Institute for Space Research (INPE) in Brazil | 15 |
| 28 | Maria Michelaraki | 11 |
| 29 | Australian Government Bureau of Meteorology | 10 |
| 30 | Michael Panayiotis | 9 |
| 31 | Deutscher Wetterdienst (DWD) | 8 |
| 32 | Kaupo Mandla | 8 |
| 33 | Data originated used to create The International Surface Pressure Databank | 7 |
| 34 | MEDARE Initiative | 7 |
| 35 | Philippe Dandin | 7 |
| 36 | Tanja Likso | 7 |
| 37 | Brazil's Instituto Nacional de Meteorologia (INMET) | 6 |
| 38 | Data was provided by Jayashree Revadekar India Meteorological Department | 6 |
| 39 | Data was provided by Juerg Luterbacher | 6 |
| 40 | Theo Brandsma | 6 |
| 41 | Midwestern Regional Climate Center (MRCC) | 5 |
| 42 | Avner Furshpan | 4 |
| 43 | Toranna Palsdottir | 3 |
| 44 | Data was provided by Ludvig Isaksson | 2 |

Table S1 continued.

| No. | Data Source Name | No. of Stations |
|-----|---|-----------------|
| 45 | Markku Rummukainen | 2 |
| 46 | Maurizio Maugeri | 2 |
| 47 | National Climate Information Centre | 2 |
| 48 | Olga Pachaliuk | 2 |
| 49 | Peter Fisher, Research and Development Division, Met Service of New Zealand | 2 |
| 50 | Tanja Cegnar | 2 |
| 51 | Tiziano Colombo | 2 |
| 52 | Amran B Osman | 1 |
| 53 | CIRCE project | 1 |
| 54 | Conor Daly | 1 |
| 55 | Eglantina Bruci | 1 |
| 56 | Fatima Coelho | 1 |
| 57 | Marcus Keane | 1 |
| 58 | Maria Antonia Valente | 1 |

Table S2 Shows the data sources and the number of monthly stations with location issues per source.

| No. | Data Source Name | No. of Stations |
|-----|--|-----------------|
| 1 | UK Met office | 2511 |
| 2 | Monthly Climatic Data of the World (MCDW) | 844 |
| 3 | World Weather Record NOA multiple sources | 784 |
| 4 | World Monthly Surface Station Climatology Dataset | 774 |
| 5 | Preliminary CLIMAT data | 527 |
| 6 | Environment Canada National Climate Data and Information Archive | 425 |
| 7 | Russource GHCND nonconus multiple sources | 418 |
| 8 | Russource ISH multiple sources | 346 |
| 9 | Royal Netherlands Meteorological Institute (KNMI) | 287 |
| 10 | NWS CLIMAT streams that are sent to NCDC | 276 |
| 11 | Russource Canada Multiple sources | 240 |
| 12 | Russource GHCND Multiple sources | 225 |
| 13 | National Snow and Ice data Central Asia Temperature and Precipitation Data | 210 |
| 14 | Russource CLIMAT Multiple sources | 207 |
| 15 | Russ Vose analysis of Mr Griffiths from various countries around the world | 180 |
| 16 | Russource TDXX MERGE Multiple Sources | 167 |
| 17 | Russource GRIFFITHS Multiple sources | 130 |
| 18 | National Centers for Environmental Information (NCEI) | 128 |
| 19 | Russource Australia Multiple sources | 91 |
| 20 | Norwegian Meteorological Institutes eKlima portal | 61 |
| 21 | International Arctic Research Center at the University of Alaska Fairbanks | 50 |
| 22 | Russource Australia WWR Multiple sources | 49 |
| 23 | Russource GRIFFITHS SA Multiple Sources | 48 |
| 24 | Scar Reader Project Antarctic Meteorological Research Center (AMRC) USA | 26 |
| 25 | Russource SOUTH AFRICA Multiple sources | 25 |
| 26 | Russource Australia de Multiple sources | 24 |

Table S2 continued.

| No. | Data Source Name | No. of Stations |
|-----|--|-----------------|
| 27 | Russource NEW ZEALAND Multiple sources | 23 |
| 28 | John Christy of UAH British E Africa Met Dept | 18 |
| 29 | Russource Brazil Multiple sources | 9 |
| 30 | Deutscher Wetterdienst (DWD) | 7 |
| 31 | Russource Chile Multiple sources | 6 |
| 32 | Russource INDONESIA Multiple sources | 6 |
| 33 | Russource MEXICO Multiple sources | 6 |
| 34 | Russource Cuba Multiple Sources | 5 |
| 35 | Antarctic Meteorological Research Center | 4 |
| 36 | German Meteorological Service Deutscher Wetterdienst | 4 |
| 37 | Russource FWA Multiple sources | 3 |
| 38 | Russource FAO Multiple sources | 2 |
| 39 | Central Institute for Meteorology and Geodynamics ZAMG | 1 |
| 40 | Russource Conus Climat Multiple Sources | 1 |
| 41 | Russource GREECE Multiple sources | 1 |