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Digitisation of Historical Observations for ERA-CLIM

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Aside from improvements in the assimilation and numerical modelling schemes, new reanalyses can significantly profit from the recovery, imaging and digitisation of historical observations. Here, we present the status and selected examples of the digitisation of historical surface, aerological and radiation measurements in the framework of ERA-CLIM, an EU FP7 project designed to prepare the data necessary for a new reanalysis going back to the beginning of the 20th century. One peculiarity of this reanalysis is the fact that it will, for the first time, assimilate upper-air data from the time before 1948.

The data rescue activities of ERA-CLIM specifically focus on the data-sparse regions, such as the Tropics, the polar regions and the world's oceans before 1957. From the time before 1957, large amounts of surface data from former colonies and from overseas territories of European countries (e.g. Portugal and France) are being digitised. These surface data make up ca. 55% of the estimated total station days that have been inventorised. Another 45% of the inventorised data consist of upper-air (aerological) observations. A relatively tiny fraction (< 1%) are atmospheric transmission measurements from 13 stations worldwide (1902-50). In case of the very early upper-air observations before the 1930s, even Europe and North America still hold an important quantity of data to be recovered in digital form.

The inventory of all identified data sources and their digital imaging have almost been completed. The digitisation is still ongoing and will partly be continued for some time. However, due to the vast amount of records identified and the large amount of data, especially in the case of upper-air (1638 inventory entries, 1.3 mio. station days) and surface data (1.55 mio. station days), a prioritisation in agreement with the goals and deliverables of the project turned out to be necessary. The largest single sources of upper-air data found were the NOAA Central Library Foreign Data section (27%, data from many countries) and Indian upper-air and weather bulletins (27%), followed by many smaller sources, each making up less than 5% of the total amount of data. For the whole project, 16% of the upper-air data inventory entries stem from aircraft, registering balloon, kite or captive balloon measurements, 25% from radiosondes, and the largest part, 60%, are pilot balloon wind observations. Quality control and reformatting of the data have started and will soon be finished so that the first version of the data can be delivered on time in June.