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Comparing the seasonal mean position, strength and seasonal variation of the Azores High and the Icelandic Low during the cold climate of the Dalton Minimum and the exceptional warmth in the late 20th century

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Existing sea level pressure (SLP) reconstructions have increasing uncertainties in properly representing the position and strength of the Azores High and the Iceland Low before approximately 1800 due to the sparse data availability over this region. Recent efforts of the CLIWOC project (García-Herrera et al. 2005, Climatic Change) have introduced wind information from ship logbooks as a valuable new marine source of direct and high resolved information on the atmospheric circulation. We use a blended predictor set including long instrumental SLP records from Europe and adjacent regions along with the CLIWOC information to obtain a gridded seasonal reconstruction of North Atlantic-European SLP back to 1750. This reconstruction particularly improves the representation of the location and the strength of the Azores High in the pre-1800 period. Using this new reconstruction, we study the geographical position, strength and seasonal variations of the Azores High and the Icelandic Low over the period 1750-2002, i.e. a period when pronounced and extended cold/warm and dry/wet periods have occurred over the eastern coast of the US, over Europe and over the Mediterranean region. We particularly focus on the comparison of the pronounced cold period of the Dalton Minimum (1790-1820) and the exceptional warmth at the end of the 20th century as well as on the general differences between the state of the atmospheric circulation in the pre- and post-industrial revolution period.