



The LIA history of the "Glacier des Bossons" (Mont Blanc area, France): a new high-resolution glacier length curve based on historical documents

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Historical and proxy-records have documented a partly asynchronous evolution in temperature, precipitation and glacial variations between European regions during the Little Ice Age (LIA), and the causes of these temporal anomalies are yet being poorly understood. To address this question, highly resolved glacier reconstructions going far back in time based on historical documents (for the last 500 years) or on dendrochronological and radiocarbon dating (for the Holocene) are very important as they give valuable insights in past climate. However, such reconstructions exist only for few glaciers worldwide, depending on the public perception and the accessibility of the corresponding glacier and its surrounding area. One of these regions of interest is the well-documented Mont Blanc area.

Here, we present a new high-resolution reconstruction of length changes for the "Glacier des Bossons", situated in the French part of the Mont Blanc area. This reconstruction is based on historical material newly discovered, that has not been evaluated so far for glacier reconstructions. More than 200, often unpublished, artworks (paintings, drawings, prints), photographs, maps and written accounts have been critically analysed and give an univocal picture of the glacier's history. Especially noteworthy are the drawings by Jean-Antoine Linck, Samuel Birman and Eugène Viollet-le-Duc which depict meticulously the glacier's extent during the vast advance and subsequent retreat during the 19th century.

The new reconstruction dates back to AD 1580. Maxima of the "Glacier des Bossons" are proved around 1610/1643, 1685, 1712, 1780, 1818, 1854, 1892, 1921, 1941, and 1983. The LIA maximum extent was reached in 1818. Until the present, the glacier has lost about 1.5 kilometres in length, and it is nowadays shorter than at any time during the reconstruction period.

The length curve of the "Glacier des Bossons" is finally analysed regarding climate data and also compared with the nearby "Mer de Glace" (glacier reconstruction back to AD 1570 available) and the two Grindelwald glaciers in the Swiss Alps (reconstructions existing back to AD 1535, and 1590, respectively). These two regions are likely the best-documented areas regarding historical glacier data.