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Documentary evidence of climate variability during cold seasons in Lesotho, southern Africa, 1833-1900

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This study presents the first 19th century cold season climate chronology for the Kingdom of Lesotho in southern Africa. The chronology is constructed using a variety of documentary sources including letters, diaries, reports, monographs and newspaper articles obtained from southern African and British archives. Information relating to cold season weather phenomena during the austral autumn, winter and early spring months were recorded verbatim. Each of the cold seasons from 1833 to 1900 was then classified as 'very severe', 'severe' or 'normal/mild', with a confidence rating ranging from low (1) to high (3) awarded against each annual classification. The accuracy of the document-derived chronology was verified against temperature data for Maseru for the period 1893-1900. Excellent correspondence of the document-derived chronology with the Maseru instrumental data and also with other global proxy temperature records for the 19th century is achieved. The results indicate 12 (18% of the total) very severe, 16 (23%) severe and 40 (59%) normal/mild cold seasons between 1833 and 1900. The overall trend is for more severe and snow-rich cold seasons during the early part of the study period (1833-1854) compared with the latter half of the 19th century (with the exception of the 1880s). A reduction in the duration of the frost season by over 20 days during the 19th century is also tentatively identified. Several severe to very severe cold seasons in Lesotho follow after major tropical and SH volcanic eruptions; such years are usually characterized by early frosts, and frequent and heavy snowfalls. The blocking of solar radiation and the enhanced northward displacement of polar fronts that are directly or indirectly associated with volcanic events, may account for many of the most severe Lesotho winters during the 19th century.

Keywords: Cold season chronology, 19th century, Lesotho, volcanic forcing