



## **The disintegration of the Wicklow Ice Cap, Ireland: patterns of ice recession during the Last Glacial-Interglacial Transition**

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We present a geomorphological assessment of the extent and dynamics of glaciation in the Wicklow Mountains, Ireland, during the Last Glacial Interglacial Transition (LGIT;  $\sim 20 - 11$  ka BP). Previous research has established the existence of a local ice cap, confluent with regional ice at the Last Glacial Maximum (LGM;  $\sim 25$  ka BP). However, there has been little consideration of ice retreat in response to climate amelioration during the LGIT. Here, we investigate ice dynamics during and after the transition from an ice cap to topographically restricted mountain glaciation. The geomorphological record indicates that initial ice cap recession was characterised by rapid retreat and large-scale disintegration, with ice masses only stabilising once topographically constrained within valleys. Following fragmentation of the LGM ice cap, three distinct landsystems were established in the Wicklow Mountains: (1) the large north-eastern sector of the region hosted a mountain icefield with multiple outlet glaciers; (2) a small plateau icefield existed in the central sector, with several outlet glaciers; and (3) several individual valley glaciers persisted in the south-western sector. Each of these landsystems document sustained retreat and subsequent stabilisation during the LGIT, prior to the Younger Dryas. Two-dimensional reconstructions of ice dynamics indicate variations in recession patterns throughout the region. Based on our ice margin reconstructions and the limited published dates for the region, we suggest that following the retreat of regional ice after the LGM, the local ice cap was relatively stable until the start of the LGIT ( $\sim 20$  ka BP). After this, ice experienced sustained thinning and ice margin retreat until  $\sim 17$  ka BP. By this point, ice was topographically restricted and the three aforementioned landsystems established. A period of ice margin stabilisation occurred before further persistent retreat until  $\sim 15$  ka BP, by which time ice had retreated into the upper reaches of valleys. It is likely that the plateau icefield and most of the mountain icefield had disappeared by  $\sim 15$  ka BP, when the outlet glaciers of both landsystems had detached from their central accumulation areas and experienced sustained retreat. Following this, some small cirque glaciers experienced minor readvance before ice recession continued. The geomorphological record indicates that it is likely that glacial ice disappeared in the Wicklow Mountains during this period but was re-established, in a small number of cirques, during the Younger Dryas.