

# Dynamics and timings of glaciation in the Wicklow Mountains, Ireland

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## Background and rationale

Reconstructions of former ice cover in the Wicklow Mountains, Ireland, remain contested. In particular, there is poor consensus concerning the Wicklow Ice Cap and the response of local ice to the Last Glacial-Interglacial Transition (LGIT; ~15-10 ka BP). Whilst it is acknowledged that the area hosted a local ice cap at the Last Glacial Maximum (LGM; ~27 ka BP), there has been little consideration of ice cap disintegration to a topographically constrained ice mass during the LGIT. A fragmentary approach to previous palaeoglaciological research has limited understanding of the glacial record in the region; this study represents the first comprehensive investigation of LGIT glaciation in the area. The project aims to ascertain the extent, timings and dynamics of glaciation in the Wicklow Mountains during the LGIT by applying a threefold approach: 1) extensive geomorphological mapping using remotely sensed data and field mapping context; 2) detailed sedimentological analysis to determine glaciation patterns and ice-marginal dynamics; and 3) relative dating to elucidate glacial chronologies.

## Initial findings

To date, work has been focused upon systematic geomorphological mapping, to establish vital geomorphological context for future detailed sedimentological and geochronological analyses. Fieldwork, funded by the BSG Postgraduate Research Grant, has highlighted that the glacial record preserved in the Wicklow Mountains is significantly more extensive than previously recognised. Although subtle, the landform record archives complex patterns of ice mass growth, decay and readvance - allowing an assessment of ice mass recession during the LGIT. Several morphological signatures (varying landform characteristics) feature within the study area, influenced, in part, by topographic controls (slope, aspect), geology and sediment transport distances. The geomorphological evidence suggests that small icefield(s) and associated outlet valley glaciers may have existed during the LGIT, following disintegration of the main ice cap (evidenced by isolated moraines and meltwater channels at the plateau edge). *Figure 1* highlights some of the interesting features mapped in the field which will form important parts of future analysis and interpretation.



**Figure 1.** a) Isolated linear features on valley floor of Glenmacnass, thought to be indicative of stream lining and fast flow; b) meltwater channels of Hollywood, drainage route of Glacial Lake Blessington; c) recession moraines at Lough Mullaghcleevaun, note bifurcation; d) talus slopes in Glenmalur with thick drift cover highlighted by gullying.

## Significance

The landscape of the Wicklow Mountains is dominated by glacial landforms recording ice mass oscillation (both sustained retreat and minor readvance) that most likely occurred during the LGIT. It is evident from geomorphological mapping that clear spatial and temporal variability, in association with a fluctuating climate, is archived in the Wicklow Mountains. Knowledge of the transition to valley-style glaciation and the dynamics of continued ice recession, during the LGIT, are fundamental to advance our current understanding of local ice behaviour during periods of climate warming. This work, in progress, will build a coherent reconstruction of ice cap recession dynamics during deglaciation, which in turn could provide an insight into possible contemporary small ice cap behavior (e.g. in Iceland and Norway) during climatic transitions.

## Grant expenditure

Table 1. Expenditure for fieldwork August 2016. See included receipts for reference, copies of original receipts are included due to shared funding. Exchange rate at time of purchase £1 = €1.20.

<b>Travel</b>		<b>GBP £</b>	<b>GBP £</b>
Ferry	<i>UK-Ireland-UK</i>	233.10	
Toll	<i>Dublin tunnel toll</i>	8.33	
Petrol	<i>See individual receipts</i>	47	
		41.67	
		39.06	
		56.96	
		46.51	
	<b>Subtotal for travel</b>		<b>472.63</b>
<b>Per diem</b>			
Accommodation	<i>Knockree Youth Hostel</i>	73.33	
Food	<i>See individual receipts</i>	71.06	
		117.13	
	<b>Subtotal for living expenses</b>		<b>261.52</b>
<b>Total cost of fieldwork</b>			<b>734.15</b>