



Evidence for former Glacial Lakes in the High Peaks and Rossendale Plateau areas, NW England.

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The identification of former ice-dammed lakes associated with Quaternary ice sheets is important for two reasons. Firstly, these lakes can contain varved sediments which can be used to establish a chronology related to ice margin position, and also provide a high-resolution (sub-annual) record of meltwater discharge from the ice sheet, which in turn can be related to climate. Secondly such lakes are commonly associated with sporadic outburst floods, which are an important geomorphic agent and can affect ice dynamics. This paper examines the evidence for the occurrence of ice-dammed lakes, ponded between the uplands of the South Pennines and the lowland, late Devensian, British Ice Sheet around Manchester, and explores the possibility of establishing a varve chronology for this area. The position of lakes has been reconstructed from a combination of borehole records of laminated silts and clays and associated sands, and morphological evidence, including shorelines and meltwater channels. Both lateral and pro-glacial ice-dammed lakes existed at Glacial Maximum in this area. Two former lakes, the High Peaks Lake, a pro-glacial ice-dammed lake, and Lake Rawtenstall, a lateral ice-dammed lake, are examined in more detail. Borehole records and one new borehole from the High Peaks Lake indicate varved sediments deposited in an ice-advance lake are preserved underneath glacial tills, but that post-glacial lake sediments are absent, indicating an ice-retreat lake of relatively short duration, and probable rapid reworking of exposed lakes sediments. Former Lake Rawtenstall contains much longer sequences of rhythmically laminated sediments, and may have existed for a considerable period of time (>1,000 years) across the Glacial Maximum. A number of shorelines were identified, indicating that lake level dropped as the ice margin receded and the lake surface area expanded. In its latter stages the lake is likely to have partly or fully drained periodically, causing outburst floods and forming subglacial meltwater channels. A new core containing rhythmically laminated silts and clays was retrieved; these are interpreted as varved and indicate cyclical variation in meltwater input during the latter stages of lake existence.