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Developing a chronology for glacial advances in the Spanish Pyrenees with luminescence dating

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Over the course of 15 years, a significant number of sediment samples directly from glacial contexts, or from significant fluvial aggradations related to glacial advances, have been dated using OSL in the Spanish Pyrenees. These provide a record of significant glaciation early during the last glacial cycle, with subsequent events decreasing in size; the LGM advance appears surprisingly small. The development and further extension of this chronology is limited by two issues. These are i) the degree of incomplete zeroing of the luminescence signal experienced by sand grains during transport in high energy fluvial systems and in glacial contexts, and ii) the poor luminescence characteristics of quartz in this region. Both of these limitations are common, if not ubiquitous, in glaciated mountain landscapes. The second limitation is caused by the luminescence properties of quartz in bedrock, and of quartz in short-residence geomorphic contexts where grains are derived directly from bedrock before being flushed from these environments. In order to overcome these constraints, several different approaches have been taken, using quartz OSL, and more recently taking advantage of recent developments in the dating of K-feldspar using IRSL (Infra-Red Stimulated Luminescence). Single grains of K-feldspar have been dated from a wide range of different high-energy fluvial contexts around the globe, using a post-IR IRSL dating protocol. Several of these localities have independent age control, providing the opportunity to assess this approach. Future directions for luminescence dating applications in Spain, and other circum-Mediterranean regions will be provided.