2021 Cordilleran Section
117th Annual Meeting
• 12–14 May
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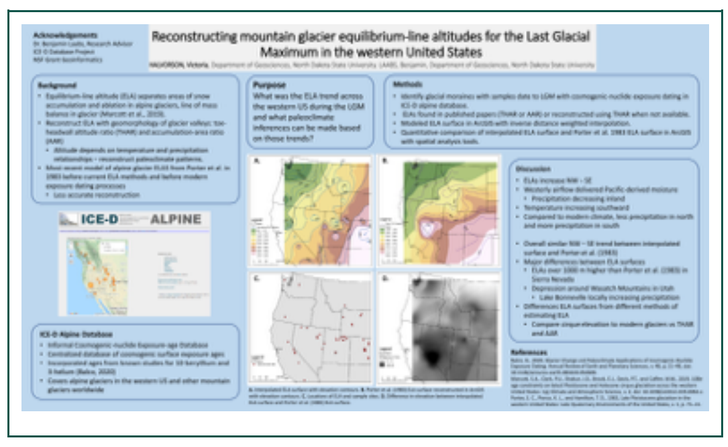
13-11 - RECONSTRUCTING MOUNTAIN GLACIER EQUILIBRIUM-LINE ALTITUDES FOR THE LAST GLACIAL MAXIMUM IN THE WESTERN UNITED STATES

Spatial Chat Room

R7: T18/T22 Life in B&R/Undergrad Res

Thursday, May 13, 2021
1:35 PM - 1:40 PM
Online - Mackay School of Earth Sciences & Engineering Room



Abstract

Important information about past climates can be determined from reconstructed equilibrium line altitudes (ELA) of mountain paleoglaciers, specifically the temperature and precipitation accompanying a glacier in equilibrium. Previous reconstructions of Late Pleistocene ELAs of mountain glaciers across the western United States have been used to infer the pattern of temperature and precipitation change across the region, although most of the work was based on presumed ages and limited mapping of glacial deposits and landforms. Cosmogenic nuclide exposure dating of moraines combined with updated mapping and aerial imagery afford an opportunity to revisit the pattern of regional ELAs during multiple episodes of the last Pleistocene glaciation. The goal of this research is to reconstruct ELAs in the same region of previous reconstructions based on glacial sediments that have been dated using cosmogenic nuclide exposure ages. We focus on the large number of glacial valleys with moraines corresponding to the Last Glacial Maximum (LGM; 26.5-19.0 ka). Paleo-ELAs are estimated using the toe to headwall altitude ratio and the accumulation area ratio determined from published glacier reconstructions and existing glacial mapping. Cosmogenic-exposure ages of moraines are compiled from the informal cosmogenic nuclide exposure age database for alpine glacial features (ICE-D Alpine) and represented in a geographic information system along with ELAs for each glacial valley. A reconstructed ELA surface spanning the conterminous western United States is produced using existing algorithms in ArcGIS. Results show reconstructed ELAs generally lower than initially estimated and a larger range of ELAs across the region. In the Sierra Nevada, ELAs increase southeastward, which is consistent with previous estimates, spanning a range from 1800 to 2800 m asl. ELAs rise eastward across the Basin and Range toward the western shore of the area covered by Lake Bonneville, and then decrease eastward toward the Wasatch Mountains. This pattern is inconsistent with previous estimates and may reflect a west-to-east precipitation gradient that differs from modern climate. We discuss this pattern and broader features of the ELA surface of the LGM and later episodes of the last Pleistocene glaciation.

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Session

13: T22. Undergraduate Research II (Posters)
***Jeffrey Marshall**, Geological Sciences, California State Polytechnic University, Pomona, Pomona, CA*

Thursday, May 13, 2021
12:45 PM - 1:45 PM
Online - Mackay School of Earth Sciences & Engineering Room

13 - Undergraduate Research II (Posters) Ended May 13, 1:45 PM

Spatial Chat Poster Hall Networking (Password: FSq41) Ended May 13, 6:00 PM

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