
42-14 - Booth No. 181: EVALUATING DUST PRODUCTION BY GLACIAL AND FLUVIAL EROSION USING FIELD AND LABORATORY EXPERIMENTS OF ROCK ABRASION, SANGRE DE CRISTO RANGE, COLORADO, USA



Sunday, September 22, 2024



8:00 AM - 5:30 PM



Hall D (Anaheim Convention Center)

Booth No. 181

Abstract

Snowpack provides a key water resource in the Rocky Mountain West and other alpine regions yet is diminishing due to warmer temperatures and reduced albedo from dust deposition. Dust deposition is increasing because of vegetation disturbance, biologic soil crust reduction, and increased forest fire severity. Here, we seek to understand the physical process of dust creation in the San Luis Valley, Colorado, an agricultural valley that relies on snowmelt from the Sangre de Cristo Range and San Juan Mountains. Dust is disproportionately sourced from the Sangre de Cristo Range, yet the rate by which bedrock in the mountains is abraded to dust is unquantified. We used a combination of field observations and laboratory tests to quantify the rate of bedrock abrasion and contrasted this rate between lithologic units and fluvial and glacial erosion regimes. In the field, grain size distributions from fluvial and glacial process domains were measured and the downstream attrition rate calculated. We compared this with abrasion mill experiments on gravel to cobble-sized clasts, which we abraded in the lab for two weeks and episodically weighed and measured. Our results allowed us to determine natural abrasion rates in each lithologic group of the Sangre de Cristo Range, which helped estimate the timescale of dust production as well as pinpoint valleys within the Range that contribute more dust material due to their unique lithologic character.

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