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Grain-size, morphometry and sediment transport in an Antarctic stream located close to the Spanish Antarctic Base 'Juan Carlos I' (Livingston Island, South Shetland Archipelago).

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In this work, we present preliminary data on grain size, morphometry, and sediment transport for the lower sector of a stream located in the South Bay of the Hurd Peninsula (Livingston Island, South Shetland Archipelago). This stream flows close to the Spanish Antarctic Base 'Juan Carlos I' (BJCI) and has a length of roughly 300 m, representing a small proglacial channel draining the front of the Hurd Glacier.

To characterize channel morphometry, we based on high-resolution topographic measures collected in the field with a dGPS (Trimble-R8S) and a 4-cm resolution photogrammetric DEM, built using aerial images taken with a drone. These data, together with field observations, allowed us to define three different sectors along the longitudinal profile of the studied stream. The most upstream sector flows through a raised beach, where the channel shows a typical braided morphology with a gentle slope (0.6°). The channel evolves downstream into a steeper (average slope 4°) and straight single-thread channel, which is incised through a series of successive raised beaches. The channel finally ends and flows into a small coastal lagoon, where it deposits its load and generates a fan-shaped sediment lobe. The lagoon is formed by the damming effect of the upper bar of the modern cobble beach.

We also sampled for grain-size characterization in four different sections: 1) a braided reach, located in the upstream sector of the channel: we observed there a highly heterometric and matrix-supported deposit, likely suggesting the influence of debris and/or hyperconcentrated flows; 2) a single-thread reach, incised into the beach terraces located in the middle sector of the channel: there, we documented a coarse, paved and clast-supported deposit that we interpreted as a basal lag; 3) the upper sector of the fan-shape lobe deposit in the coastal lagoon: we observe a coarse, but heterometric grain-size distribution typical of bedload transport; and 4) the lower sector of the fan-shape deposit: we reported a sand-rich grain-size distribution, typical of fluvial sediment transport. The observed downstream trends in grain size suggests a change in the rheology of the flow during the dominant channel-forming floods from hyperconcentrated to stream flows.

Moreover, we have launched a monitoring study of sediment transport processes in this stream. To do so, we seeded 50 PIT-tagged stones (tracers) for RFID tracking along two different cross-sections located in the single-threaded, middle sector of the studied channel. The tagged cobbles were collected from the riverbed, drilled and sealed with resin, after inserting PIT-tags into them. All

these tasks were carried out at the BJCI facilities during the 2018-19 Antarctic campaign, and we are planning to return there in the 2022-23 campaign in order to track and document the tracer displacements.