



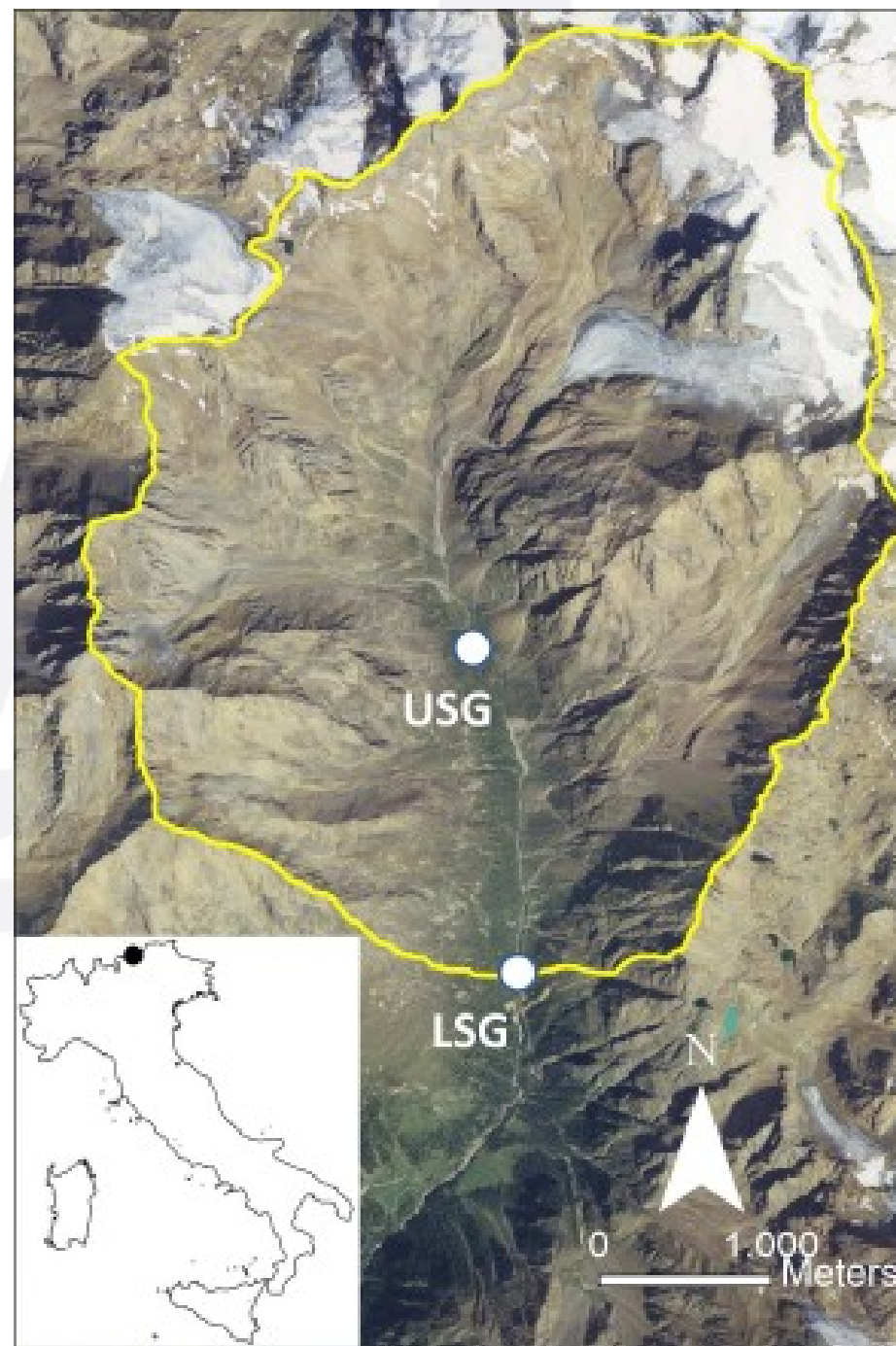
Saldur river

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General description

The study area is the upper Saldur basin (Eastern Italian Alps), whose elevations range from 2150 m a.s.l. (location of the main monitoring site, LSG) and 3738 m a.s.l. (Weisskugel/Palla Bianca peak), for a total area of 18.6 km². The main glacier hosted in the basin lies between 2700 and 3700 m a.s.l., with a current extent of 2.8 km² (it was 4.9 km² in the 1800s at the peak of the Little Ice Age). Therefore, 15% of the basin area is currently glacierized.

The Saldur basin belongs to the Ötztal-Stubai complex and mainly consists of orthogneiss. Several rock-glaciers and large moraines are found in the basin, but their connectivity to the main channel appears to be rather limited. Other sediment sources are represented by talus slopes (mostly located at the higher elevations), shallow landslides (of limited extent) and large alluvial/debris fans reaching the valley bottom from the steep tributaries. Permafrost is present at elevations higher than 2600-2800 m a.s.l., depending on local conditions. Shrubs and alpine meadows represent the only vegetation cover.



The longitudinal profile of the river (from the glacier front at 2730 m a.s.l. to the monitoring section at LSG, for length of 4,58 km) displays a series of valley steps, the largest and steepest of which is in bedrock, the others due to the fans mentioned above. The average channel slope is 12.6%, but this varies from about 30% of bedrock reaches to about 5% along the reaches immediately upstream of the valley steps, where the Saldur river widens and attains a braided pattern, with channel width up to 30-50m. However, single-thread reaches are overall dominant, with slopes about 6%, channel width of about 4-6m, featuring step-pool and cascade characteristics but with occasional glide-run units and lateral bars. The reach just upstream of the main monitoring station LSG is highly confined by the adjacent hillslopes and features a 6% slope, 5-6 m width, and a bed morphology transitional from plane-bed to step-pool.

Climate

The average annual precipitation in the lower Saldur basin (at about 1600 m a.s.l., where long-term records are available) is about 550 mm, but it increases with altitude up to 1000 mm in the study catchment. Precipitation occurs in the study area as snowfall from November to late April, but snow storms can occur also during the summer at the higher elevations. Snow cover is almost complete over the entire study basin until late April, whereas at the end of the summer only few patches of snow are present at the higher elevations, on the glacier surface or in sheltered couloirs.

General description of monitoring site

The main monitoring site for bedload in the Saldur catchment is located at LSG (2150 m a.s.l.)

Geographical coordinates are 46°45'03" N, 10°42'10" E.

The monitoring station has been installed at the narrowest section (3m) along the upper Saldur river Channel banks here are stabilized by very large boulders, and in late May 2011 the department of Hydraulic Engineering of the Autonomous Province of Bozen-Bolzano placed a wooden log transversally in the channel bed – anchored against the boulders of the banks and stabilized by a sort of boulder ramp – to host the pipe Hydrophone.

During the works, the lowermost stationary PIT antenna of the "Quattro" system has been installed in front of the log and stabilized by boulders.



Bedload sampling is carried out mostly by "Bunte" traps at 2 to 4 positions simultaneously along a cross-section 12m upstream of the pipe hydrophone. At the same cross-section, water stage is measured (from May to November) every 10 min by a pressure transducer, and stage-water discharge relationship is derived based on several discharge measurements carried out using the salt dilution method, from low flows up to near-bankfull conditions. A fixed probe measuring water turbidity, electrical conductivity and temperature is installed here as well. Bottle samples for determining the relationship between suspended sediment concentration and turbidity are taken periodically. Finally, an automatic camera takes picture of the channel every hour.

A second site for water and bedload monitoring lies at a higher elevation (USG, 2350 m a.s.l., drainage area 11.2 km²). The only fixed installation here consists of a pressure transducer records water stage at 10 min interval. A raingauge managed by EURAC is located nearby. Bedload here is monitored by "Bunte" traps at max 2 positions simultaneously across the channel. In summer 2012, PIT-tagged clasts of different size have been placed on the riverbed at USG to determine travel time to LSG.

