

Acid rock drainage in mountain catchments from the Pyrenees

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Since the early 2000s naturally occurring acid rock drainage (ARD) in headwater catchments from the Pyrenees is causing acidification of lake and stream mountain waters. ARD also results in forming extensive aluminium-rich white coatings on the streambeds. The coatings are currently very visible in the landscape (Fig. 1). Before 2000 no white streambed coatings existed in these catchments. ARD is now spreading across the Pyrenees, aluminium white streambed coatings are continuously popping up in the highest catchments of the mountain chain.



Figure 1: Streambeds with aluminium-rich white coatings.

Ordovician to Upper Proterozoic psammitic and pelitic rocks with minor limestone, volcanic and sulfide rich levels are the main bedrock lithologic types of the catchments. Talus cones, screens, rock glaciers, tills, and minor landslides are the Quaternary deposits that overly bedrock geology.

What, since the early 2000s, suddenly triggers ARD in these catchments is still a subject of research. Global warming might have a heavy impact in increasing or triggering ARD. In the Pyrennes, current rise in average summer temperatures is causing a decrease of permanent snow and ice areas. Residual permafrost is also thawing as a consequence of global warming. Fast melting of snow, ice and permafrost dramatically increases runoff. High runoff rates caused by global warming can trigger ARD in bedrock and Quaternary deposits rich in sulfites.