

## Seminario

# Is the present the key to the (deep) past? Exploring analogies between modern and Precambrian fluvial basins

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Aula Arduino

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Uniformitarianism – the doctrine of invariant physical laws in space and time – remains a cornerstone of geology, and its application has proven particularly useful when interpreting past surface processes from sedimentary rocks. Yet, the application of uniformitarianism to the Early Earth's record has proven challenging thus far, due to radical differences in the palaeogeographical and palaeobiological settings of Precambrian (< 541 Ma) and younger landscapes. The rise of macroscopic life near the Precambrian-Cambrian boundary, and the ensuing colonisation of landmasses operated by vascular plants, in particular, have been classically considered as revolutionary events with important impacts on terrestrial surface processes.



In this seminar, the merits, pitfalls, and limits of uniformitarian approaches to the Precambrian fluvial rock record are explored. The speaker first presents the results of sedimentary-facies mapping and architectural analysis aimed at reconstructing the morphodynamics of selected Precambrian fluvial basins in the Canadian Arctic and Northwest Highlands of Scotland. Focusing on aspects such as river-channel geometry and planform, no significant differences are gleaned between the functioning of Precambrian and younger riverine landscapes. Then, a database of active barren rivers found in large endorheic provinces worldwide is introduced to compare the mobility of fluvial channels in the absence and presence of macroscopic life within alluvial plains. Results indicate that, overall, the presence of vegetation slows down channel mobility by about an order of magnitude. It is therefore demonstrated how, even without altering channel geometry and planform, vegetation might have forced a dramatic shift in the pace of sediment and biogeochemical fluxes on Earth's continents.

Proponente: **Massimiliano Ghinassi**