

What is geomorphology?

Geomorphology is a scientific discipline that studies the shapes of the earth's landscape and their evolution. The so-called "fluvial" geomorphology is thus interested in the beds of rivers and their evolution. Depending on the countries and the scientific schools that run it, river geomorphology is taught in **geography**, **geology** or **engineering sciences** (fluid mechanics, hydraulics). It is in fact an interface discipline that is enriched by these different disciplinary perspectives. In France, "fluvial geomorphologists" are mainly geographers and more rarely geologists. They often work closely with river hydraulics engineers.

All of them approach the scientific field according to **questions that complement each other and build a living interdisciplinarity**, particularly in France. The Société hydrotechnique de France, certain national seminars and even major conferences, such as "Gravel-Bed Rivers" or "River Flows", contribute to promoting these exchanges and scientific hybridization.

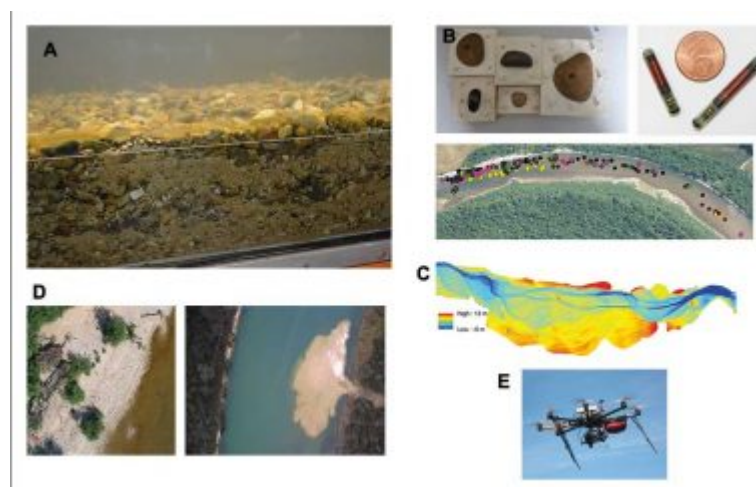


Figure 1. Some examples of tools and data used in geomorphology. (A) Physical model reproducing a river bed in a laboratory. (B) Artificial pebbles equipped with track markers that are tracked through the channel during flooding. (C) Digital Terrain Model obtained by LiDAR Airborne. (D) Aerial photographs acquired by drone. (E) Example of a hexacopter drone equipped with a hyperspectral imager. [Sources: (A) H. Piegay, (B) F. Arnaud and M. Cassel, (C) S. Tacon, (D) J. Lejot, (E) K. Michel]

Geomorphology has long been **a field science**, with metrology at the heart of knowledge production, particularly for quantifying riverbed evolution and solid transport. With the development of new tools, such as LiDAR [1] or hyper spectral imaging [2], sonar, new SFM photogrammetry [3], the multiplication of acquisition vectors (satellite, aircraft, drone) and the improvement of spatial, temporal and spectral resolutions, **river remote sensing** [4] provides more and more elements for geomorphologists to study the river corridor. It is not only studied locally, but also more broadly at the level of a section, or even at the regional level. Technical development (dating, videography) also makes it possible to explore the dynamics from the second to the millennium. And RFID solutions [5] make it possible to monitor the mobility of the bottom load and thus renew the study of solid transport [6].

References and notes

Cover image. [Source : © Bertrand Morandi]

[1] <https://fr.wikipedia.org/wiki/Lidar>

[2] https://www.sfpt.fr/hyperspectral/?page_id=168

[3] https://en.wikipedia.org/wiki/Structure_from_motion

[4] Carbonneau P., Piégay H., (2012). Fluvial remote sensing for science and management. John Wiley & Sons.

[5] <https://popups.uliege.be/0770-7576/index.php?id=4476>

[6] The new edition of "Tools in Fluvial Geomorphology" (2016 - first edition in 2003) thus offers a synthesis in 22 chapters of the field with an entry by techniques and methods.

L'Encyclopédie de l'environnement est publiée par l'Université Grenoble Alpes.

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