

River deep: Einstein's contribution to earth science

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Albert Einstein is famous for a lot of reasons, but the movement of sediments in rivers is perhaps not one of them. Yet, his name is associated with those of Ackers, White, and Shields who developed equations to help explain how grainy materials transported as particles in

a river move. Given the importance of sediment from the physical or chemical degradation of rocks in a waterway and the impact they have on erosion, entrainment, transportation, deposition, and compaction, it is not surprising that geologists, geographers, and others involved in understanding waterways are more than a little familiar, however.

Now, Hydar Lafta Ali, Badronnisa Binti Yusuf, and Azlan Abdul Aziz of the Universiti Putra Malaysia, Thamer Ahamed Mohammed of the University of Baghdad, Iraq, have attempted to simplify the Einstein equation for the calculation of suspended [sediment transport](#) in rivers. Writing in the *International Journal of Hydrology Science and Technology*, the team explains how they have validated their simplified form of the equation against data from eleven rivers located in different parts of the world. Indeed, their results show that the new simplified equation performs well when compared with Einstein's and Bagnold's equations and when tested on data from the Atchafalaya, the Red, the South American, the Rio Grande and the Al-Garraf rivers.

It is important to understand river sediment especially in the face of changes driven by natural disasters and global climate changes. Sediment plays an important role after all, in the delivery of nutrients for [aquatic ecosystems](#), as well as for agricultural purposes, the formation and preservation of river deltas, the provision of sand as a building material, as well as the course taken by a river.

The team says that future studies will employ the proposed [equation](#) statistically on other rivers around the world to verify its accuracy still further.

More information: Hydar Lafta Ali et al. A simplification of the Einstein equation for the calculation of suspended sediment transport in rivers, *International Journal of Hydrology Science and Technology* (2018). [DOI: 10.1504/IJHST.2018.095536](https://doi.org/10.1504/IJHST.2018.095536)

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