Title: **MODELLING SUSPENDED LOAD TRANSPORT WITH LINEAR CONCENTRATION PROFILES**

Preference: A5 - Modelling of modern river morphodynamics
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In the field of understanding the sedimentary processes, the numerical simulations have always played an important role. Many problems, going from local silting processes to long-scale evolutions of river morphology, can be studied thanks to hydraulic models including sedimentary aspects. As a consequence, there is a great interest for efficient numerical models of sediment transport. In numerical simulations, it is always necessary to find an optimum between the simplicity of the conceptual model and a good representation of real phenomena. In this context, the models using depth-averaged and moment equations are an interesting compromise between full 3D and simple depth-averaged models. This paper presents the use of a moment equation for suspended load transport. A simple but representative model for the sediment concentration profiles is developed. This original bi-linear concentration profile is compared to the traditional Rouse-profiles and shows a good correspondence despite its great simplicity. This profile is used in combination with the advective-diffusive equation governing the suspended load transport. Advective and diffusive sediment fluxes are developed analytically and lead to a concise formulation, which is an asset for practical use. The developed profile can be univocally determined provided that both the mean concentration and the concentration moment are known for the suspended sediments. An additional equation is therefore needed to compute the concentration profiles. A differential equation for the sediment concentration moment is fully developed, and a special attention is cast to the source term. 1D simulations show the capacity of the model to successfully reproduce laboratory experiments described in the literature. Thanks to its quality, this model has a great potential in the field of sediment transport modelling, both for scientists to understand fundamental sedimentary processes and for practitioners.

The figure below shows the experiment of the evolution of a trench in a sediment bed (simulated results and measures).