

Generalised Serre-Green-Naghdi equations for open channel and for natural river hydraulics.

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In this talk, we present a new non-linear dispersive model for open channel and river flows. These equations are the second-order shallow water approximation of the section-averaged (three-dimensional) incompressible and irrotational Euler system. This new asymptotic model generalises the well-known one-dimensional Serre-Green-Naghdi (SGN) equations for rectangular section on uneven bottom to arbitrary channel/river section. The section-averaged model is asymptotically consistent with the Euler system in terms of mass, momentum and energy equation which provides the richness of content for this model. We propose a well-balanced finite volume approximation and we present some numerical results to show the influence of the section variation.

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