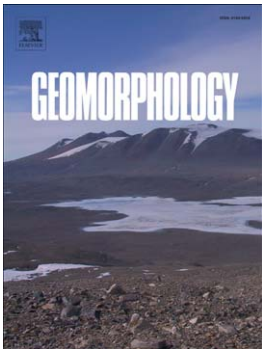

On the upscaling of process-based models in deltaic applications

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On the upscaling of process-based models in deltaic applications

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Abstract. Process-based numerical models are increasingly used to study the evolution of marine and terrestrial depositional environments. Whilst a detailed description of small-scale processes provides an accurate representation of reality, application on geological timescales is restrained by the associated increase in computational time. In order to reduce the computational time, a number of acceleration methods are combined and evaluated for a schematic supply-driven delta (static base level) and an accommodation-driven delta (variable base level). The performance of the combined acceleration methods is evaluated by comparing the morphological indicators such as distributary channel networking and delta volumes derived from the model predictions for various levels of acceleration. The results of the accelerated models are compared to the outcomes from a series of simulations to capture autogenic variability. Autogenic variability is quantified by re-running identical models on an initial bathymetry with 1 cm added noise. The overall results show that the variability of the accelerated models fall within the autogenic variability range, suggesting