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Numerical study of the development of 3D morphodynamic model and an application to an intertidal flat in the Ariake Sea.

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In recent years, it is suggested that intertidal flats play an important role on the improvement of the water quality and the ecosystem of the coastal zone. It is very important to investigate the sediment transport on intertidal flats in order to predict the morphodynamic change of them. Kuriyama et al. (2004) estimated sediment budgets on an intertidal flat at the mouth of the Shirakawa River in the Ariake Sea in Japan by using field data. Only from field data, however, it is difficult to investigate the sediment transport and to predict the morphodynamic change, therefore the numerical simulation comes to be a very important technique. Uchiyama (2004, 2005) developed a quasi-3D cohesive sediment transport model named “WD-POM”. It consists of the POM, the wetting and drying scheme and sediment transport model of cohesive sediments based on the advective diffusion equation. Uzaki (2007) made an application to an intertidal flat at the mouth of the Sirakawa River. In this study, the wave forcing and the surface shear stress due to the wave breaking by Newberger & Allen (2007) and the sediment transport model of sands based on the Bailard model were installed in order to make a calculation at the storm condition. In my presentation, the model description and numerical results of both the basic and the improved models are shown. Numerical results of the basic model revealed good agreements with observation results at the calm condition. The results also showed the erosion of 90,000 m3/yr over the whole survey area in 2001, however, it was smaller than the estimation by Kuriyama et al. (2004). Numerical results of the improved model showed good agreements with observation results at the storm condition and almost the same sediment

budgets and the erosion quantity through a year by filed data.