



The effect of residual water level slope on tidal propagation in the Yangtze estuary

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As the tidal wave propagates into the estuary, usually the tidally averaged water level rises in landward direction. This effect is even stronger if there is substantial river discharge. In this study, we focus on the effect of this phenomenon on tidal wave propagation in Yangtze estuary, which is the largest river in China with an annual mean freshwater discharge of 28300 m³/s measured at the upstream boundary of the estuary (Datong station, 1950–2010). This is done by exploiting a one-dimensional analytical model for tidal hydrodynamics, which accounts for the effect of residual water level slope. The aim of this study is to provide insights into the relative importance of residual water level slope on tidal dynamics, which could be used for improving the prediction of tidal propagation in estuaries, especially when the influence of river discharge is significant. Subsequently, it is in principle possible to develop a method for estimating river discharge with observed tidal damping along the estuary by using an inverse analytical model.