

## Loading Estimation from Major Streams using GRDC & GEMS/Water dataset, combined with continental river-runoff model

Yosuke Yamashiki<sup>1\*</sup>, Kenichi Tatsumi<sup>1</sup>, Tomoko Teramoto<sup>2</sup>, Roberto Valmir Da Silva<sup>2</sup>, Kaoru Takara<sup>1</sup>, Miyazawa Yasumasa<sup>3</sup>

<sup>1</sup>DPRI Kyoto University, <sup>2</sup>GSE Kyoto University, <sup>3</sup>JAMSTEC

We aim to estimate nutrient loading from Continental Zone throughout major river basin using the GEMS/Water Water Quality Dataset for the purpose of estimating the gross nutrient loading to the marine environment. We applied GRDC discharge dataset for the loading estimate based on the "observed" data. The locations of GEMS/Water and GRDC stations have been compared to identify appropriate station set to calculate loading. We also made gross estimation of future nutrient loading using continental-scale river basin model featuring GDBD (Global Drainage Basin Database) calibrated with GRDC monthly and daily discharge dataset. For those GEMS/Water data-missing stations we introduced continental-scale river water quality model. Some of those outputs are used for the boundary condition of general ocean circulation model to integrate continental-oceanic material circulation.

Throughout estimation, those rivers which may introduce significant impact on surrounding ocean has been identified: Amazon and La Plata River for Atlantic Ocean, Yangtze for South-China sea, Amur for Okhotsk Sea, Limpopo for Southern and South-western Indian Ocean, Brahmaputra River for Eastern Indian Ocean. Some rivers show significantly high nutrient loading compared with their discharge due to anthropogenic impact of their catchments. We should focus on monitoring those streams to identify impacts for surrounding marginal seas. Rivers flowing into Arctic Ocean show high loading for nitrogen compound and BOD, which should be evaluated by further investigation to secure the quality of dataset.

Keywords: Loading, Nutrient, Continental-scale River, GEMS/Water, GRDC