# The fluxes of $CH_4$, $CO_2$ and $N_2O$ from Yangtze estuary intertidal flat in summer season

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Carbon dioxide ($CO_2$), methane ($CH_4$) and nitrous oxide ($N_2O$) are three primary greenhouse gases in the atmosphere; occupy 70%, 23%, and 7% respectively in the greenhouse forcing. Many recent studies indicate that wetlands are major sources of greenhouse gas emissions. In July and August 2004, static, closed chamber technique was used to investigate the emission and consumption of $CH_4$, $CO_2$ and $N_2O$ *in situ* at Chongming east tidal flat (CM), which is the biggest and well developed typical estuarine intertidal flat wetland of Yangtze estuary. Triple black (opaque) and white (transparent) air chamber collectors were employed to collect air exchange samples at the tidal flat-atmosphere interface during ebb tide. Data indicated that CM low tidal flat was the source of atmosphere $CH_4$ in summer, the emission flux was 40.2μg·$m^{-2}$·$h^{-1}$. At the same time, low tidal flat was the sink of atmosphere $CO_2$ and $N_2O$, the adsorption flux was -86.3mg·$m^{-2}$·$h^{-1}$ and -86.3μg·$m^{-2}$·$h^{-1}$ respectively. In July and August, middle tidal flat was the source of atmosphere $CO_2$, $CH_4$ and $N_2O$. The day average emission flux of $CO_2$, $CH_4$ and $N_2O$ was 6.56 mg·$m^{-2}$·$h^{-1}$, 301 mg·$m^{-2}$·$h^{-1}$and 69.9μg·$m^{-2}$·$h^{-1}$. Temperature (including air temperature and different depth ground temperature), the sediment organic material content and the photosynthesis and respiration of the tidal flat plant (*Scirpus mariqueter* and benthonic alga) were the main effect factors on the production emission and adsorption of $CO_2$, $CH_4$ and $N_2O$. Correlation analysis show that middle tidal flat-atmosphere interface $CO_2$, $CH_4$ and $N_2O$ flux had a significant positive correlation to environment temperature (including air temperature and different depth ground temperature), but at low tidal flat, the correlation was not significant.

# Influence of cumulative dams on the flux and isotopic composition of dissolved inorganic carbon

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During the last century, human activities have seriously disturbed the terrestrial water cycle. The most noticeable example is hydrological alterations associated with the dam and reservoir development. In 1996, there were approximately 42,000 large dams in the world [1]. River regulation has become an important environmental problem affecting the world today.

Dam effects have proven a major mechanism changing the nutrients fluxes and ratios in river, destroying aquatic habitat and the biodiversity. As a result, the river's pristine status in hydrological condition, nutrients structure and aquatic ecosystem has been shifted to "lacustrine/reservoir" autotrophic type prevailing with planktons. Increased photosynthesis in impounded river thus will have a response to the concentration and the carbon isotopic composition of dissolved inorganic carbon (DIC).

Here, we reported based on the investigations with cumulative reservoirs in Wujiang Basin that during reservoir process DIC content will be increased and $\delta^{13}C_{DIC}$ become more negative. Generally, in epilimnion, [DIC] is lower in Summer-Autumn and higher in Winter-Spring, while $\delta^{13}C_{DIC}$ is more postiove in Summer-Autumn. In the water column, [DIC] increases with the water depth and the $\delta^{13}C_{DIC}$ shows a trend to become more negative in deep water. Due to the fact that the reservoirs in study area are high water head dams, the outflow has higher [DIC] and more negative $\delta^{13}C_{DIC}$. Consequently, the cumulative effects should have significant contribution to the hydrochemistry composition of downstream.

[1] Rosenberg *et al*. (2000) *Bioscience* **50**(9) 746-751.