Chou et al. study seasonality of aqueous CO_2 in the East China Sea (ECS) with a tremendous heterogeneity. They regard the dataset presented by Tsunogai et al. (1999) as representative seasonality of sea surface CO_2 in the ECS in 1990s. And then they suggest that the seasonality of aqueous CO_2 in the ECS have changed between 1990s and 2000s. However, more historical datasets can be dug out from several literatures in Chinese so as to check their argument.

Zhang et al. (1997) reported another autumn dataset of sea surface CO_2 in the ECS in 1990s. In late October 1994, sea surface partial pressure of CO_2 (pCO_2) was mostly measured at 380-530 μatm in the inner shelf area and at 320-350 μatm in the outer shelf region of the northern ECS (Zhang et al., 1997; Fig. 1), while the air-equilibrated pCO_2 level was measured in situ at 340-350 μatm. This distribution pattern is similar to Chou et al.'s autumn dataset in November 2011 but much different from that in October 1993 (Figs. 2c-2d in Chou et al.'s manuscript), reported by Tsunogai et al. (1999). This complicated intra-seasonal variation of sea surface pCO_2 has been reported in the outer Changjiang Estuary by Zhai and Dai (2009). Actually, a low pCO_2 event in October 2006 was clearly observed in the outer Changjiang Estuary (Zhai and Dai, 2009), although the collapse of water stratification and thereby release of bottom oversaturated CO_2 occurred in autumn. In temperate oceans, seasonal cycles of phytoplankton production are characterized by spring and autumn blooms (Lalli and Parsons, 1997). Generally the autumn blooms are weaker than the spring blooms. Therefore, both high pCO_2 and low pCO_2 can be observed in most autumns in the inner shelf area of the temperate ECS. How do we convincingly work out a decadal change of autumn sea surface pCO_2 based on limited datasets?

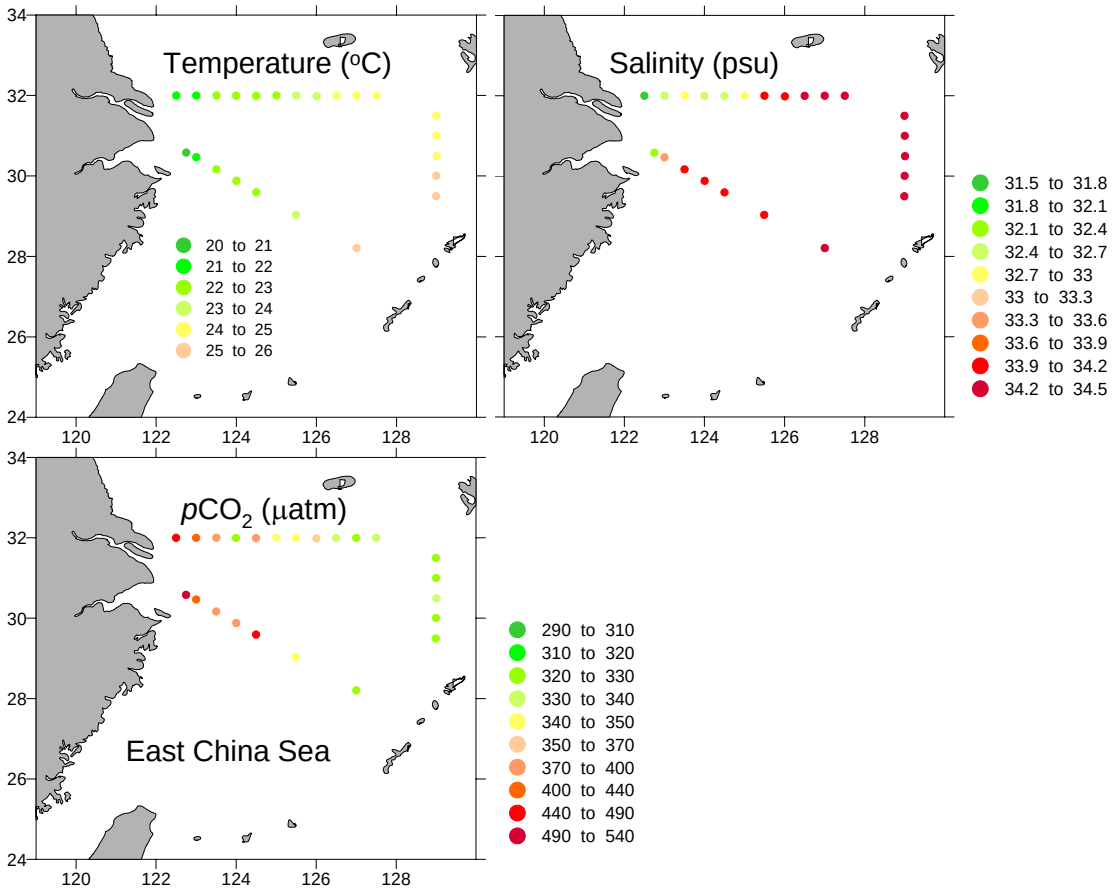

Fig. 1. Sea surface temperature, salinity, and partial pressure of CO_2 (pCO_2) in the northern East China Sea in late October 1994. The pCO_2 data are reproduced from Zhang et al. (1997).

Chou et al. also suggest stronger summer absorption of atmospheric CO_2 in the inner shelf area of the ECS in the 2000s compared with the 1990s. However, Zhang et al. (1999) presented their measurements in the East China Sea in July 1998, showing significant sea-air pCO_2 differences between -100 μatm and -200 μatm in the northwestern inner shelf area (Fig. 2). These values are similar to Chou et al.' results obtained in similar region in July 2011.

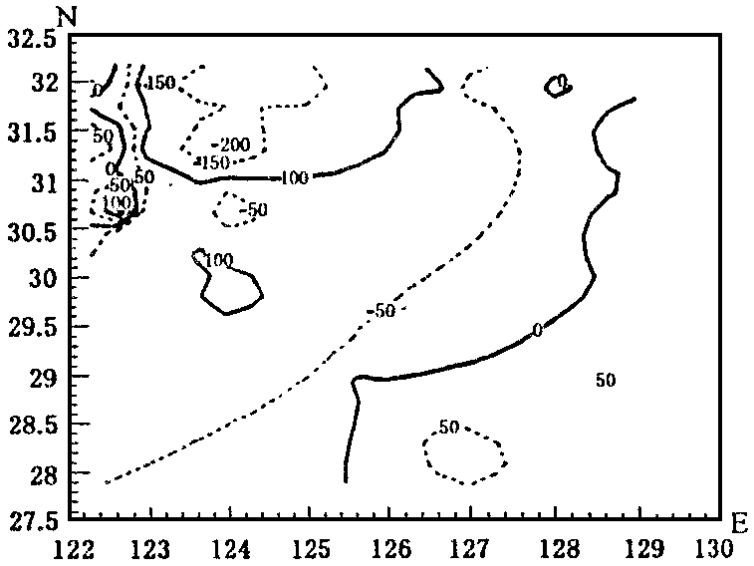

Fig. 2. Sea-air pCO_2 differences in the East China Sea in July 1998 (Zhang et al., 1999).

In summary, spatial distributions of aqueous CO_2 in the East China Sea are subject to huge seasonal/intra-seasonal and inter-annual variations. It is difficult for us to distinguish eutrophication-induced decadal changes of aqueous CO_2 in this highly dynamic marginal sea based on snapshot-like cruise datasets.

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