

Detecting Saturation in the Ocean Carbon Sink

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Recently, the 4.5 million observations used to create the Takahashi et al. (2009) surface ocean $p\text{CO}_2$ climatology were released to the scientific community. This collection of individual $p\text{CO}_2$ observations has never before been available to researchers outside the ocean carbon community, and this opportunity has generated innovative new lines of research. In this presentation, I demonstrate a new method for the fusion of $p\text{CO}_2$ data, which manifest all the intense variability of the upper ocean, with ocean interior carbon data, which through ocean inverse methods provide a strong constraint on long-term mean surface fluxes of CO_2 . With some climatological flux information coming from interior observations, the obligation of surface observations to constrain long-term means by themselves is reduced. The surface observations can more fully express their interannual and mesoscale variability in this framework, and I model that variability in terms of satellite observables such as sea surface temperature. I use this technique to evaluate multi-decadal trends in global surface ocean $p\text{CO}_2$, in order to test recent claims that the ocean carbon sink is saturating.

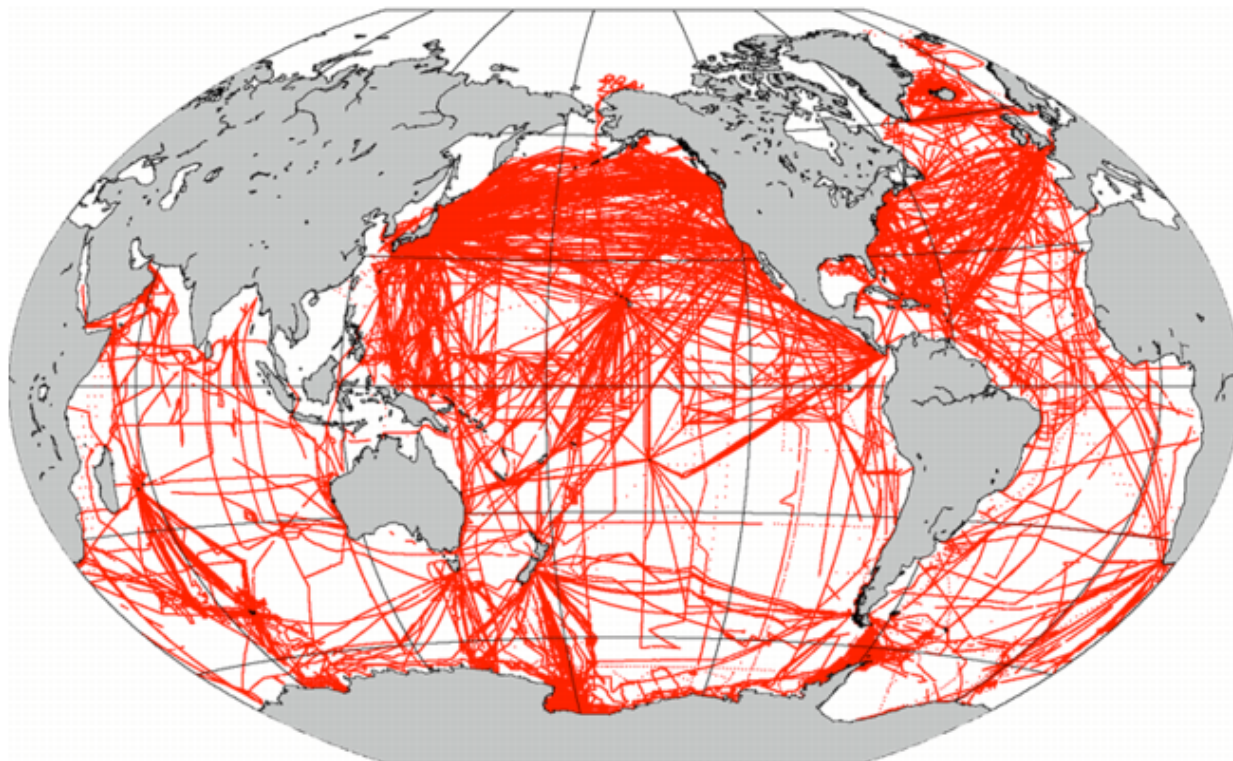


Figure 1. Locations of the more than 4.5 million surface ocean $p\text{CO}_2$ observations during 1968-2008 in the recently released Takahashi et al. (2009) database.