



## **Seasonal variations of carbonate system parameters and nutrients at the shellfish-farming bays along the south coast of Korea**

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About 80~90% of the annual mass production of shellfish in Korea are cultured at the inner bays including Jinhae, Tongyeong and Geoje regions, along the south coast of Korea. To understand coastal carbon and nutrients cycles and those effects/feedbacks on shellfish farming, carbonate (DIC, TA and pH) and environmental parameters were observed at Jinhae, Tongyeong and Geoje Bays 4 times (in Feb., Aug. 2014, Apr. and Oct. 2015 and are considered representative of winter, summer, spring and fall respectively). Surface temperature in the bays showed clear seasonal variation with about 6~12°C and 24~29°C in Feb. and Aug. 2014, respectively and 14~18°C and 22~26°C in Apr. and in Oct. 2015, respectively. Surface pH<sub>NBS</sub> also ranged with about 8.20~8.53 and 7.28~8.95 in Feb. and Aug. 2014, and 8.04~8.40 and 7.91~8.32 in Apr. and in Oct. 2015. High pH with low salinity in summer resulted from input of land discharge in rainy seasons, however high pH at small bays in Apr. and Oct. 2015 resulted from massive primary production by phytoplankton bloom, supported by high chlorophyll a concentrations. Seasonal variations of DIC and phosphate in the surface and bottom waters correlated largely with salinity, higher in winter and lower in summer. Specifically in shellfish (specially, oyster and mussel) growing season, aragonite saturation state ( $\Omega_{arag}$ ) in bottom water ranged about 0.2~2.9 (mean 2.1) and 2.2~5.0 (mean 3.2) in Feb. 2014 and Oct. 2015, respectively, suggesting low pH environments arose seasonally in coastal area due to some mechanisms. These results suggest that seasonal ocean acidification state might seriously affect shell growth, mass production and thus shellfish industry along the south coast of Korea.