Increase in biological productivity slows down ocean acidification in the marginal seas of the northwestern Pacific Ocean

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The marginal seas in the northwestern Pacific are fed by nutrients supported mainly by river discharge and atmospheric deposition of anthropogenic nitrogen (N). The seasonal and interannual dynamics of primary production and carbonate chemistry associated with anthropogenic N input were investigated in coastal waters of Korea (the Yellow Sea, East China Sea, and East Sea (Sea of Japan) using time series data collected from 2015 to 2017 (April, August and October). Analysis of carbonate data revealed that organic carbon production (photosynthesis) dominates over inorganic carbon production (calcification) in the study area. The changes in surface pH and pCO_2 (calculated at a constant temperature from TA and DIC) via photosynthesis of phytoplankton were comparable to a magnitude of the alterations due to temperature variation, indicating that net impacts of ocean acidification and global warming can be mitigated by biological activity in the coastal marine ecosystem.