

Elevated nutrients and surface chlorophyll-a associated with natural methane seeps in the Haima cold seep area of the Qiongdongnan Basin, northern South China Sea

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Cold seeps are a significant source of methane to the ocean. However, nutrients and Chl- α in the euphotic layer overlying cold seeps have been poorly studied. Variations in Chl- α , nutrients, environmental parameters, and CH₄ concentrations in the Haima cold seeps were analyzed. Results show that the overlying water exhibits a typical low nutrient and low Chl- α marine environment. Phosphate and Chl- α were significantly elevated, and the average SCM in cold seeps was much higher than that in control stations. Spearman correlation analysis indicated Chl- α in cold seep was positively correlated with salinity and negatively with nutrient and CH₄ concentrations. It implied that the CH₄ concentrations may promote the increase of Chl- α , and may be linked to CH₄ plumes, bringing cold, nutrient-rich waters to the thermocline. However, due to the CH₄ plumes hardly to track, more sampling is needed to determine the effects on Chl- α and phytoplankton in the euphotic layer.