Geophysical Research Abstracts, Vol. 8, 02404, 2006
SRef-ID: 1607-7962/gra/EGU06-A-02404

Effects of the invasive gastropod, *Crepidula fornicata* L., on benthic carbon and nitrogen fluxes in the Bay of Brest (France)

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The American slipper limpet *Crepidula fornicata* L. is an invasive species in European bays and estuaries since the 1950s and can reach values up to several thousands of individuals per m^2. We estimated the impact of *C. fornicata* on benthic community metabolism by comparing two contrasting sites with high (> 1000 ind. m^{-2}) and low (< 200 ind. m^{-2}) densities, in the Bay of Brest (Brittany, France). Measurements of dissolved inorganic carbon (DIC) and dissolved inorganic nitrogen (DIN, NH_4^+ + NO_3^- + NO_2^-) at the water-sediment interface were investigated using dark benthic chambers. Community respiration was 1.5 to 3-fold higher in the station with high densities, where it varied from 1.5 mmol C m^{-2} h^{-1} in winter to 5.9 mmol C m^{-2} h^{-1} in summer. DIN regeneration was 4 to 11-fold higher in the station with high densities, where itvaried from 0.1 mmol N m^{-2} h^{-1} in winter to 0.5 mmol N m^{-2} h^{-1} in summer. Annual community respiration averaged 440 g C m^{-2} yr^{-1} in the highly colonized station, and 180 g C m^{-2} yr^{-1} in the station displaying low density of *C. fornicata*. Annual community DIN regeneration averaged 40 g N m^{-2} yr^{-1} in the highly colonized station, and 3 g N m^{-2} yr^{-1} in the lowly colonized station. The estimated annual community respiration for an average density of 260 ind. m^{-2} in the Bay of Brest was 220 g C m^{-2} yr^{-1}, being higher than the overlying phytoplankton carbon production in the bay (148 g C m^{-2} yr^{-1}). Nitrogen regeneration calculated for a density of 260 ind. m^{-2} (12 g N m^{-2} yr^{-1}) may supply a significant proportion of the phytoplanktonic nitrogen demand (25 g N m^{-2} yr^{-1}). Thus, *C. fornicata* communities can be considered as a major source of carbon and nitrogen, influencing

pCO_2 in seawater and favoring CO_2 efflux to the atmosphere, and increasing eutrophication in shallow coastal waters.