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Biogeosciences Discussions

Interactive comment on "Interpretation of benthic foraminiferal stable isotopes in subtidal estuarine environments" *by* P. Diz et al.

Anonymous Referee #2

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Coastal environments have been among the ecosystems with the longest and most severe pollution histories. An accurate and precise reconstruction of these environments is one of the most important missions within geosciences today since it will allow us to understand the (long-term) relationship between ecosystems and human activity. Reconstructions, however, are hampered by the fact that shallow water environments are very variable and rapidly changeable. Furthermore, there are not so many proxies that can be used with confidence to reconstruct past time environments in coastal areas. Here, this study evaluates shallow-water foraminiferal stable isotopes which can record ambient environmental factors and thereby proves to be a new, interesting and rewarding approach.

Sediments were collected from four stations along the Aural river estuary, western part

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of France, faced to the Bay of Quiberon. The study was carried out at the appropriate place where have obvious environmental gradients, particularly for salinity, that allows analysis of environmental species relationships. Employed sampling methods for sediments and seawater contain no problems. The environmental information (e.g. temperature and salinity) was automatically recorded by a logger and the data quality and quantity are sufficient for the author's purposes. The measurement procedures meet global standard and indicated accuracy are of a satisfactory level.

Unfortunately, some important questions arise with regard to the measurement strategy and the discussion and are spelled out below. However, the emerged data sets of foraminifera must be communicated to the scientific communities of limnology, marine ecology, micropaleontology and geochemistry.

The authors predicted the calcification season of two shallow water foraminifera from isotopic results. However, the indicated prediction shows a very broad range. Even though isotopic measurements were carried out with 6-10 specimens, the size variations, related to the age/lifetime of the specimens, are not indicated. The size distributions of specimens are necessary to judge whether the predicted calcification seasons are reasonable. I think it is also possible that the size can be read as lifetime of the specimen by previous culture experimental results on growth rates (Bradshaw, 1957 and/or Diz et al., in prep. (P7465, L25)). The prediction of calcification seasons should be discussed with the predicted lifetime of specimens.

Further, it is difficult to believe at once from established ecological knowledge of shallow water foraminifera that the two species don't calcify their test during summer (P7465 L9, L14). Water temperatures are around 22-24°C during summer at the stations, which makes an ideal temperature for growth and reproduction. Salinity may not have been fatal, although the salinity was a little bit higher than optimal. It could also well be that both populations from winter and spring were the product of the same reproductive period in the autumn before.

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The authors don't use carbon isotope as salinity proxy though they found clear relationship between carbon isotopic compositions and water mixing (i.e. salinity) in the sampled region. Could this serve as a new salinity proxy even though the range of applicable conditions is limited?

Minor questions.

How did the isotopes fluctuate during the day (P. 7457 L6; every 2h)?

The depths of sampling sites are not indicated. Did some lie above the water? (P. 7458 Sampling sites)

Interactive comment on Biogeosciences Discuss., 6, 7453, 2009.