

Interactive comment on “Temporal variability of live (stained) benthic foraminiferal faunas in a river-dominated shelf – faunal response to rapid changes of the river influence (Rhône prodelta, NW Mediterranean)” by A. Goineau et al.

Anonymous Referee #1

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The presented manuscript addresses the benthic ecosystem variability in a river-dominated shelf. Such ecosystems are characterized by highly variable environmental conditions and are susceptible to seasonal changes in river runoff and related physical, sedimentological, and biogeochemical processes. Particularly, these environments allow for the study of the ecology of opportunistic taxa and the monitoring of anthropogenic impacts. To date, little is known on the small-scale benthic foraminiferal distribution in prodelta environments and on the response to major flood events. The presented data provide snapshots for a wide range of seasonal environmental condi-

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tions and related faunal responses.

The manuscript is well organized and, overall, the English appears correct. The text sometimes appears a bit awkward and would generally profit from shorter sentences making it easier for the reader to follow the argumentation, particularly in the discussion chapter. There are a few substantial issues that should be considered in order to enhance the significance of the study. Appropriate revision will likely require moderate changes.

A) In the introduction chapter, the authors should clearly state how this manuscript differentiates from existing studies and manuscripts (specifically, Goineau et al., 2011a, b; Mojtahid et al., 2009, 2010). Inspection of the mentioned papers reveals significant overlap of the topic, scientific questions, results, and partly also figures. I regard this an important issue, which should be commented by the authors. What are the major new results and conclusions of the new study going significantly beyond the existing knowledge? Why is the new study necessary to understand the Rhone prodelta environmental variability? In this context, it should be considered that the cited study of Goineau et al. (submitted to J. Foramin. Res.) is not accessible yet. This paper should only remain cited in the final version of this paper if by then accepted.

B) The author put quite some efforts on the characterization of food sources and biogeochemical processes at the sea floor. Without any doubt, this information is crucial for the understanding of faunal composition and environmental variability. However, additional information on the detrital components of the substrate, particularly grain size composition, appears also important since substrate changes commonly influence biogeochemical processes in the surface sediment. In this context, presentation and discussion of any available granulometric data would be useful. Since the authors studied the 63-150 μm and $>150 \mu\text{m}$ fraction, they should at least be able to provide information on the sand versus pelite content.

C) The authors demonstrate that the ecosystems of the shallow site (Station A, 24 m

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water depth) are strongly impacted by flood events of the Rhone river. Because of its shallow water depth, this site will be also influenced by wave and current action, particularly during the stormy winter season. As far as I know, storm wave base is well below 24 m water depth. The potential impact of wave action is neglected in the discussion of faunal results although it likely influences the stability / variability of the shallow water benthic ecosystem. In the revised version, the authors should therefore address this issue.

D) The authors sliced the upper 5 cm of the cores providing the option for microhabitat studies. It is a pity that no data on the down-core distribution of the taxa are presented. Such information would have been particularly interesting to further characterize the differences between sites and seasons, and, specifically, to explain the mono-specific or low-diverse faunas after the major flood events. In December 2008, Station A was sampled only two days after a major flood event associated with a 3 cm thick silty layer that contains a monospecific assemblage of *L. scottii*. The authors speculate that the individuals of *L. scottii* may have been transported with the flood event and originate from shallower environments in the river mouth which may well be correct.

Below the suspension layer, the former surface layer should be still present, if not eroded by the flood event. If not eroded, I would expect the 3-5 cm layer to contain quite some stainable foraminifers of the pre-event fauna, because they are either still alive or have only recently died due to burial. On the other hand, absence of stained individuals of the pre-event fauna in the 3-5 cm level would suggest either that sediment was eroded by the flood event or that disturbance was not solely caused by the river flood but may have been preceded by other disturbances, such as wave action during winter storms or other flood events. Therefore, I strongly recommend that in the revised version, the authors will add data on the down-core distribution of at least the major taxa in order to check for the presence and diversity of the pre-flood event fauna. This would add important data on the general variability of this site.

E) The authors may also consider adding a short paragraph or subchapter on the fos-

silization potential of the Rhone prodelta faunas. Fossil assemblages should present an integration over various seasons and years. In this context, it would be interesting to discuss if information on the seasonal variability and impact of abrupt events were still traceable in the fauna, e.g. by appearance of opportunistic taxa. Such knowledge would be particularly useful for the interpretation of fossil assemblages from comparable shallow-water environments.

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