

Interactive comment on “Geodynamical processes in the channel connecting the two lobes of the Large Aral Sea” by E. Roget et al.

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We would like to thank Professor Micklin for his comments and his insider’s view of the main topic of our paper. Below we comment on the points he has raised and how we wish to proceed.

We are not sure the term Kulandy channel is very common in the literature, although we do understand that it originates from the Kulandy Peninsula, north of the channel. We will mention in the text, however, that the channel is sometimes referred to as the Kulandy channel.

1.- We are not challenging the common notion that human activity has been the dom-

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inant cause of the desiccation. However, it does not account for 100% of the ongoing shrinking. The natural drying of the regional climate could also have played a considerable role. According to some model estimates, it could account for up to 30% of the desiccation, while the remaining 70% is due to human impact [see the book by Bortnik and Chistyayeva (1990) included in the reference list]. In any case, to clarify this issue the corresponding paragraph is now rewritten as follows: “Within this context, the Aral Sea is one of the most paradigmatic examples of a series of seas “dying” under the combined effect of climate change, i.e., warming trends across Central Asia (Chase et al., 2000), and an overwhelming anthropogenic influence in the form of expanding irrigation (Micklin, 1988), which have been demonstrated to affect regional meteorological conditions (Small et al., 2001; Khan et al., 2004; Khan and Holko, 2009).”

2.- We suspect the bathymetric maps of 1981 the reviewer is referring to are more recently published versions of the map we have used. The chart we used was the only one available to us. We know that this particular bathymetric map has been used by other authors in a number of recent studies. In any case, the discrepancies we have found in the shoreline of the northern part of the Large Sea were restricted only to the deep channel itself. Elsewhere, as the reviewer has found, the differences were small: at most within one meter of the depth variation.

3.- We do not claim that the bathymetric maps were inaccurate; to the contrary, we intended to demonstrate that, according to rather accurate maps of the time, the bottom at the location where the channel was later formed had been about 7 m shallower than it is nowadays. It is indeed possible that during the present shrinking period, bottom erosion in the channel has been acting upon its previous historical bed, which was later buried by sediment. That is an interesting point that we will introduce in the discussion section of the revised paper.

4.- Following the reviewer’s suggestion, after line 8 of page 5288 we will add: Also, most years during spring/early summer the Small Aral has a “positive” water balance, leading to outflow (now overflow of the dam regulating the discharge from the Small

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Aral). This flow raises the level of the Eastern Basin so that there is a flow through the channel of relatively fresh surface water from the Eastern to the Western Basin.

5.- Although when we first wrote the paper this was not yet the case, we agree with the reviewer that the channel will soon be a thing of the past, and, accordingly, on line 17 of page 5288 after “. . .of the lake”, we will add, following the reviewers suggestion: “Nowadays, however, the channel will soon be a thing of the past. The Eastern Aral for several years has received little or (in 2009) no flow, from either the Syr or Amu rivers. The Eastern Basin is nearly dry and has divided into a small piece into which the Kulandy channel flows and a larger piece to the south. The southern end of the channel where it flows into the Eastern Basin is nearly closed and the channel has become an arm of the Western Large Aral.”

Finally we would like to add in the acknowledgments: We are grateful to Professor Micklin for the interesting points he has raised in his review and for the opportunity to incorporate them in the text.

E. Roget in the name of all the co-authors

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