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Hydrology and Earth System Sciences Discussions

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

Anonymous Referee #2

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Detailed comments:

I would suggest some minor revision (in the chapter Introduction or Site description) regarding the geodynamic situation (tectonic) in the N Large Aral Sea region:

This channel has first be observed by Danis Nourgaliev (personal communication in Zavialov: Physical Oceanography of the Dying Aral Sea 2005. p 131) in a seismic profile recorded in the westernmost part of the channel.

Yet there is no access to seismic profiles across the channel in the E part. Thus we have to stick to info provided by the geological map of USSR. Looking at the Geological Map in a close-up from the N Aral Sea region we note several faults which control the

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morphology of the different basins. Faults are also of particular importance for the shape of the straight. So far the geomorphological features (basins and incision) are a result of geodynamics s. str. (tectonics) in this region and well documented by faults running across (in a conjugated system) the lake (see red lines in the additional figure "Aral Sea fault.ppt"). This tectonic setting explains most probably for the steep gradient (5 m "offset"; Fig.3) observed along the straight E basin to W Basin of the Large Aral Sea.

Furthermore the high flow speed (up to 0,45 m/s) should have remove quite a bit of sediments from the bottom bed. However, looking at the bathymetric map (Fig. 5, e.g.) no true delta feature at the W end of the channel is evident (maybe you show a close-up which could if present evidence the delta feature). Given the tectonic features we must assume that the channel represents an incision partly formed along tectonic fault, into the "hard", consolidated Cretaceous sediments and is therefore an older feature formed longer ago (most probably the incision formed progressively during earlier low lake-level stands). I would agree with P. Micklin's comment that during high stands the channel might have filled with allochthonous and autochthonous particles... but sediments were eroded again as soon as flow speed increased above a critical speed. Thus the incision of a feature rather due to repetitive low-high water level cycles than due to this actual mostly irrigation controlled low level stand. (see repetitive past Syrdary Inflow-dominance as described in Oberhänsli et al., Irrigation and Drainage 2008). The fact that the channel was not outlined in earlier bathymetric maps (produced during high stands) could be a problem of resolution and geographical focussing (nobody was expecting to find a channel) or a hint for refilling of the channel...

Some more technical comments to figures:

Fig. 2 and 8 can be merged to fig a, b

Fig. 6 It would be nice to reference the 3 cross sections e.g., in Fig. 5 or simply add the coordinates

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6, C2363–C2366, 2009

Fig. 5 a close-up of a bathymetric map showing the western outflow region including the Chernishov Bay (it can easily be put in into the lower right angle) would be instructive (delta: yes or no?)

Table 1 info could go into the figure caption of Fig.2

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HESSD
6, C2363–C2366, 2009

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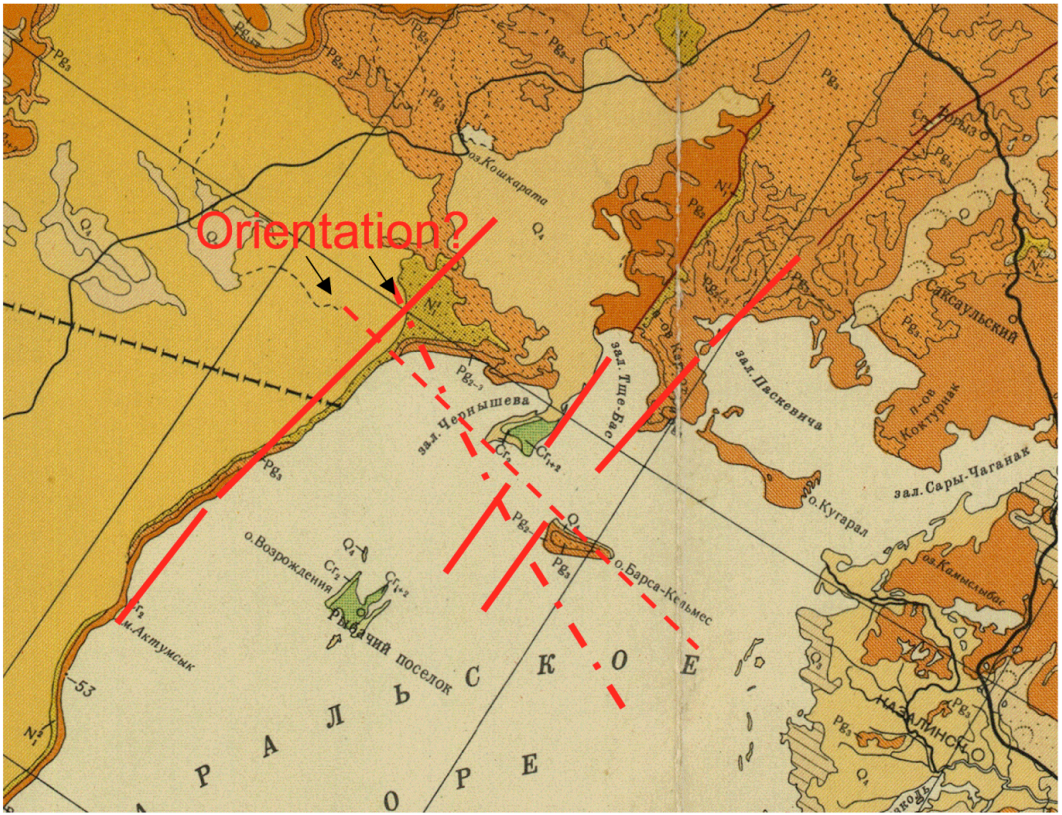

Fig. 1. Additional information showing some relevant tectonical features (in red: faults)

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