

Interactive comment on “Multiproxy records of climate variability for Kamchatka for the past 400 years” by O. Solomina et al.

O. Solomina et al.

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Review #1 We very much appreciate the comments of the referee #1 and are aware of most of the problem that he raises. The main problem discussed in the review - a different sensitivity of various kinds of proxies to climatic parameters - is indeed one of the most important in the multi-proxy reconstructions. In our case the early summer temperature revealed by the tree rings does not necessarily coincide with the summer temperature which controls the ablation of glaciers. On the other hand the accumulation recorded at Ushkovsky glacier at the elevation of about 3900 m can be very different from the accumulation at the Koryto glacier, located close to the sea level. However in general the three types of records (tree ring, ice core and moraines) seem to broadly agree rather well in Kamchatka. In order to better show this agreement we included a new figure (Fig. 7) displaying the 31-years smoothed tree-ring chronology

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(proxy for summer temperature) together with the number of moraines averaged for 20-years interval. Smoothed this way the "summer temperature" curve shows an interval of depressed temperatures in the second half of the 19th century and a rise in the 20th century with a moderate decrease in 1970th. This temperature record is in strong agreement with the glacier variations in the region, i.e. maximum glacier advance in the late 19th century, subsequent retreat, and minor advance in 1970s. In our revised version we also now show that the tree ring chronology that we use positively correlates not only with the May-June as reported before, but also with May-August, and therefore is a record of temperature throughout the ablation season.

The reviewer had two questions concerning the glacier response time and moraine deposition are also very important and traditional for this type studies. In our case however, the reaction of the glacier tongue to the mass balance changes appears to be rather fast. In the regions where we studied moraines (Kozelsky, Koryto, Kropotkina glaciers) the glaciers are very small (mostly less than 1 km²) and temperate, so they react to the climatic changes almost immediately. Many glaciers advanced or stabilized their retreat in 1970s-1980s in response to the cooling of this period. The error of the moraine dating by lichenometry, tree colonization and tephrochronology is comparable with the reaction time of these ice tongues. Therefore within this accuracy and using the smoothed time series for temperature and precipitation climatic proxies we can expect the agreement between the data. We very much appreciate this comment and included the short discussion on response time in our revised version.

Interactive comment on Clim. Past Discuss., 2, 1051, 2006.

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