Holocene sea-level changes in King George Island, West Antarctica, by virtue of geomorphological coastal evidences and diatom assemblages of sediment sections.

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Location and Materials

The Filde Peninsula, King George Island (South Shetland Islands) is located in maritime West Antarctica.

The construction of relative sea-level changes is based on assembled and analyzed factual data: bottom sediment cores from lakes, shells in situ, marine algae in situ, penguin bones in marine terraces, elevation profiles of marine forms in the peninsula shores, fossil mollusks in situ.

This material includes the results of previous studies (see References) and some evidences collected during our field and laboratory work period 2009 - 2014.

New Holocene Sea-Level Curve

Evidences of relative sea-level changes were analyzed for further visualization on the Fig. 4 using elevation and age axis. During constructing the curve of relative sea-level changes the subsequent factors were considered:

- The marine forms prevalence at the specific altitudes and their extent may indicate that a period of abrasion, accumulative marine activity was prolonged at these altitudes.
- The altitude and age of marine organic detritus in situ discovered into cross sections may show the minimum sea-level height when the detritus was buried.
- The altitude of mosaics in deposits may point out the maximum possible sea level in the moment of moss growth.
- The substitution of marine sedimentary conditions with freshwater conditions found into bottom sediment cores from lakes. The age of this shift and elevation of the examined lake reveal the moment of relative sea-level decrease. Nevertheless the altitude of sea level at the time of presence marine conditions in lake basins, and the time of term shift can be estimated approximately only.

The age values of organic detritus of marine genesis were corrected for AMRE (Antarctic Marine Reservoir Effect).

The values of age scale are the radiocarbon years before present (C¹⁴ yr BP).

Comparison and Conclusions

Figure 5 shows the comparison of the new relative sea level curve and curves from preceding studies (Wachuth et al., 2011; Pallay et al., 1997). The key difference of our curve is that it is based on a wider spectrum of data including the new collected evidences. The curve was constructed using not only lake sedimentary core, but also new absolute ages of organic matter and studied geomorphological characteristics.

The new relative sea level curve indicates the phasic drop of sea level. In our opinion, it could be result both:
- of tectonic factor contribution and Holocene transgression rates;
- of revealed changes of Filde Peninsula deglaciation (Verkulich et al., 2012).

References:


