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Outstanding Student PosterContest

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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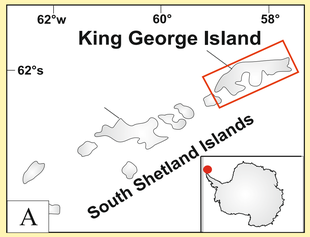
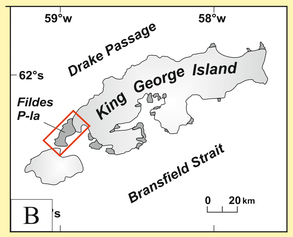
Location and Materials





The Fildes 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 material: 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 mosses 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.

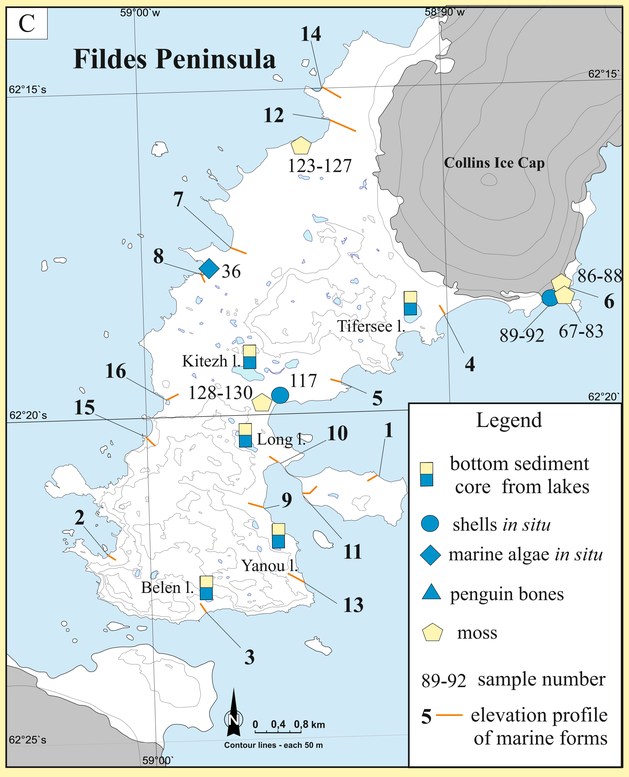


Figure 1. A, B - the location of study area.
C - scheme of factual material. There are allocations of geological evidences such as lake bottom sediments, cross sections with dated organic material and elevation profiles.

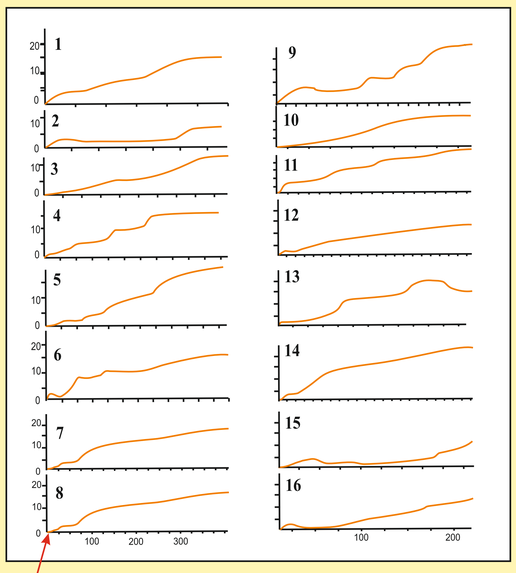


Figure 2. Elevation profiles of marine forms, Fildes Peninsula. Number show the allocation of each profile on the Fig.1.

Figure 3. Pictures of cross sections for samples 89-92 with shells *in situ*, 123-127 with mosses, 117 with marine terms and 36, where the early holocene marine conditions located below freshwater conditions (mosses). The last picture shows the beach ridge in front of sample 36.

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 mosses 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 core 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 terms shift can be estimated approximately only.

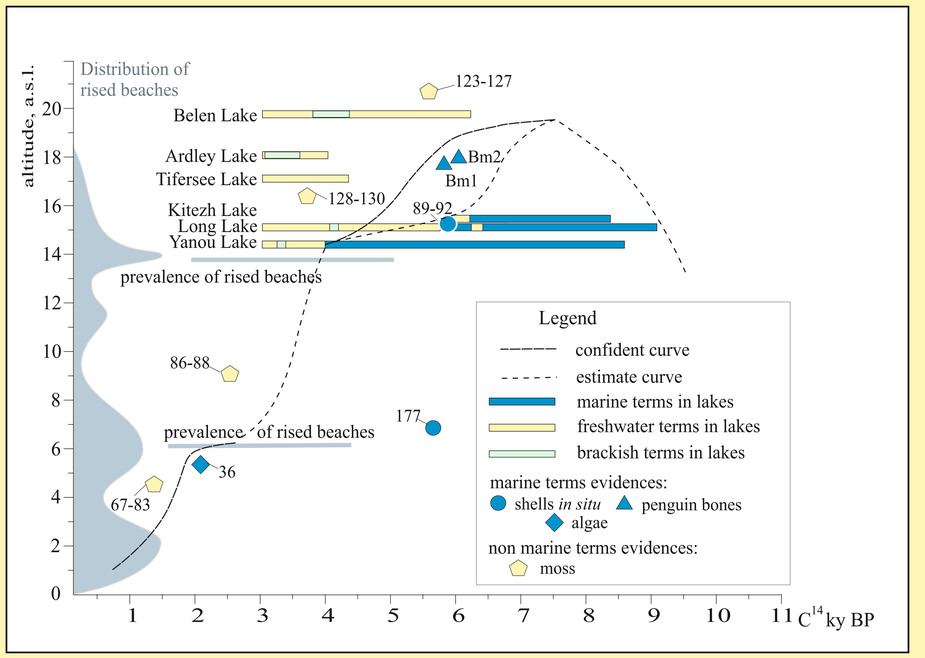


Figure 4. The holocene relative sea-level curve for Fildes Peninsula. Curve based on information about raised beaches prevalence, dated terras (Bm - Barsch, Mausbacher, 1986), shells in situ (89-92, 177 - Verkulich et al., 2012), marine algae (36 - Verkulich et al., 2012), mosses (67-83, 86-88, 128-130, 123-127 - Verkulich et al., 2012) and conditions of lake bottom sediment core (Watcham et al., 2011).

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 (C^{14} yr. BP).

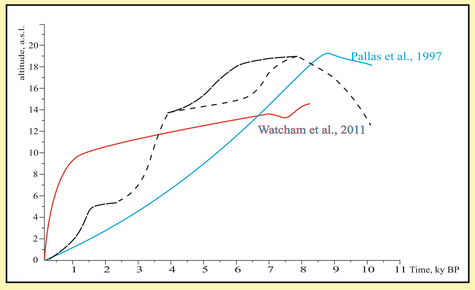


Figure 5. The comparasing of relative sea-level curves: blue curve (Pallas et al., 1997), red curve (Watcham et al., 2011) and black one (fig.4).

Comparison and Conclusions

Figure 5 shows the comparison of the new relative sea level curve and curves from preceding studies (Watcham et al., 2011; Pallas 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 cores, 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 Fildes Peninsula deglaciation (Verkulich et al., 2012).

References:

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