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GeoUnion Alfred-Wegener-Stiftung
Arno-Holz-Str. 14, 12165 Berlin, Germany
Tel.: +49 (0)30 7900660, Fax: +49 (0)30 79006612
Email: infos@geo-union.de

Editorial office
Schriftleitung

Dr. Christof Ellger
GeoUnion Alfred-Wegener-Stiftung
Arno-Holz-Str. 14, 12165 Berlin, Germany
Tel.: +49 (0)30 79006622, Fax: +49 (0)30 79006612
Email: Christof.Ellger@gfe-berlin.de

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Prof. Michael Kuhn
Institut für Meteorologie und Geophysik der Universität Innsbruck

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(Christiansen manus) contribute to the understanding of local cracking dynamics. Two permafrost cores from central ice-wedge polygons were collected by hand drilling and sampled at 10 cm intervals. Two river cut cliff sections, exposing ice-wedge host sediments, allowed detailed studies of the sediments and one ice-wedge (Fig.1). 53 samples were analysed with respect to ice content, magnetic susceptibility, pH-value, electric conduc-tivity and grain-size. High resolution remote sensing data were used to map and study the crack network (DLR 2008).

Significant inter ice-wedge site variations were detected, regarding ice-wedge morphology, network geometry and the host sediment, in particular the stratigraphy, soil moisture and active layer depth. The ice-wedges found at the base of the active layer indicate eather recent syngenetic activity or recently increasing active layer depths. The general stratigraphy shows a glacio- fluvial or organic unit covered by a 1.5 m loess unit. OSL dates (UNIS report) suggest that sedimentation continued during the Late Holocene with higher rates at site A than at site B. The ice-wedge exposure shows intensively deformed host sediments covered by 10-30 cm undisturbed loess. Desiccation crack structures are found in the upper 50 cm in the studied active layer pits. An OSL age from one of the pits indicates that drier soil conditions prevailed since the onset of the Little Ice Age (LIA). Cooler temperatures, as existing during the LIA, appear favourable for thermal contraction cracking, followed by a period of less ice-wedge activity at site A. The observation of modern nearby inactive and active ice-wedges suggests that site-specific conditions such as primarily soil moisture, are decisive for the ice-wedge dynamics in a maritime arctic environment. For a more comprehensive understanding, site-specific studies are necessary for improving our understanding of the key climatic/ meteorological ice-wedge controlling factors.

The arctic ice alga Ancylonema nordenskiöldii – ultrastructure and physiological potential

Andreas Holzinger, Daniel Remias, Cornelius Lütz

Institute of Botany, University of Innsbruck

In search for cold-adapted phototrophic organisms living on bare ice we were successful with the detection of a green alga, *Ancylonema nordenskiöldii* (Zygnematales) on glaciers in Svalbard. This species exclusively thrives on wet icy surfaces during summer and was collected at two arctic glaciers at Svalbard (Longyearbreen near Longyearbyen, Midtre Lovenbreen near Ny Alesund, ~79° N). Similar samples had been collected also previously in Svalbard[1] and the distribution seems to be focused in the northern hemisphere, with abundant appearances in Greenland and Alaska[2]. Only sparse observations of this extremophile have been made in central Europe (Switzerland)[2], the species has not been found in the Austrian Alps[3].

Ancylonema cells are distinct in their life form compared to classical snow algae, like e.g., the unicellular cysts of *Chlamydomonas nivalis* (Chlamydomonadales), the origin of the "red snow" phenomenon[4]. *A. nordenskiöldii* is filamentous organized with smooth, poreless cell walls typical for "sarcoderm desmids". No signs of cyst formation have been observed so far. It belongs to the family Mesotaeniaceae, giving ultrastructural features that are astonishing for an organism living directly on ice. The cytoarchitecture acquired by TEM points towards physiologically very active cells with numerous mitochondria, Golgi bodies, a peroxisome and two pyrenoid-containing chloroplasts. The nucleus is situated in the cell centre, surrounded by organelles like Golgi bodies and mitochondria. Approximately half of the cell volume is occupied by vacuoles with electron dense contrast.

The cells are physiologically active in their harsh habitat and we measured a temperature optimum close to 1°C, as shown by photosynthesis measurements under different temperatures. The storage of high amounts of brownish, water-soluble secondary pigments in cytoplasmic compartments is regarded as a protection against excessive irradiation. Given these observations, the arctic *A. nordenskiöldii* appears quite similar to *Mesotaenium berggrenii*, a Mesotaeniaceae found on Alpine glaciers[5]. *A. nordenskiöldii* appears to be a strictly cryophilic organism, well adapted to its habitat, namely the thin water film directly on ice. A molecular characterisation of *A. nordenskiöldii* has not yet been performed but is ongoing.

Reproductive Structures in Bryophyta from the Argentine Islands as Regional Warming Indicators

Viktoria Ivanets[1], Oksana Tyshchenko[3], Ivan Parnikoza[2], Iryna Kozeretska[3], Peter Convey[4]

[1]National University of Kyiv-Mohyla Academy, Ukraine
[2]Institute of Molecular Biology and Genetics NAS of Ukraine

[3]Taras Shevchenko National University of Kyiv, Ukraine
[4]British Antarctic Survey, Cambridge, UK

The development of sexual reproductive organs and the sporophytes in Bryophyta is generally linked with temperature or photoperiod. Capsule development and sporogenesis occur under conditions of cold Antarctic only at less than 25% of moss species. Sporophyte production in the maritime Antarctic is unusual, however overall 40% of species in this region have at least once been recorded with sporophytes. The rarity of successful sporophyte production is consistent with our recent observations on the Argentine Islands region. Thus, no signs of spore production was revealed in 147 specimens of 14 species of Bryophyta collected by V.Bezrukov (2002, 8 specimens), L.Manilo (2004, 28 specimens), V.Polishchuk (2005, 20 specimens), I.Dykyy (2006, 6 specimens) and V.Trokhymets (2007/08, 85 specimens). Fruiting bryophytes were collected during southern summer seasons 2006/07 by I.Dyyky. In particular, spore production in the dominating moss *Bryum archangelicum* Bruch & Schimp. has been documented from two locations on Galindez Island. Both locations are interesting. One location is right near the station close to diesel generator windows and is influenced by the warm air (S 65°14.439′, W 64°14.580′). The second one is no less interesting in that it represents the only known place where *Colobanthus quitensis* (Kunth) Bartl. grows on Galindez Island (S 65°14.528′, W 64°14.332′). Based on data available so far, it is difficult to evaluate the anthropogenic influence on spore production in Bryophyta, specifically the activity at the station or local favorable conditions which probably is the case with the only location of *Colobanthus quitensis* on Galindez Islands.
During the 2007/08 season (V.Trokhymets) spore production was not revealed in any of the bryophyte specimens from Galindez Island in spite of the fact that geographic representation of the samples was broad, and the number of samples being perhaps the largest ever collected by any of Ukrainian polar expeditions. However, it should be noted that in this case, just like during all previous seasons, the polar winterer did not have any special task to search for mosses with sporophytes, and their presence was estimated based on analysis of the whole pool of specimens collected for diverse goals. During the 2009/10 season I.Dykyy, a winterer, was oriented to survey this trait and has registered several successful spore production events in bryophytes (the species still to be identified) on Galindez Island, as well as a series of such events in the Argentine Islands region. It is interesting that one of the spore production events was found, again, at the only location of *Colobanthus quitensis* on Galindez Island.
The existing records of sporophyte occurrence, including the proportion of species and sporophyte characteristics, demonstrate a similar pattern to that of vascular plants in that no clear connection with their position within overall geographic distributions is evident. However, it is also known that differences in microclimate between two distant sites in this region can be equal to those between sites that are close by, thus influencing the frequency of sporophyte generation. Nevertheless, the latitudinal transect represented by the Antarctic Peninsula and Scotia arc is currently affected by rapid regional climatic changes the impact of which may be either positive or negative for components of terrestrial vegetation, including sporophyte production. Vegetation responses to warming will therefore develop as a mosaic strongly dependent on the microclimate of any specific site, and the influence of warming may be masked by inter-seasonal variation, microclimate heterogeneity, and inappropriate spatial scaling during studies.
We admit that regular monitoring of reproductive structures and traits in bryophytes at selected locations throughout the maritime Antarctic is needed in order to provide currently lacking robust data on biological responses to environmental variability and change. Our field work was supported by National Antarctic Scientific Center of Ukraine.

Porifera (Sponges) of the deep Weddell Sea, Antarctic: Preliminary results from the ANDEEP-SYSTCO expeditions, 2002-2008 with RV "Polarstern"

Dorte Janussen[1] and Christian Göcke[1]

[1]Forschungsinstitut und Naturmuseum Senckenberg, Frankfurt am Main

The Antarctic deep-sea Porifera fauna is systematically documented, described and analyzed for the first time. We present some of the new, mostly still preliminary, results from the investigations on the ANDEEP and SYSTCO campaigns.
During the ANDEEP I-III and SYSTCO expeditions (2002-2008), sponges were sampled from the deep Weddell Sea and surrounding areas by various benthic sampling gears, especially Agassiz trawl, epibenthic sledge and Rauschert-dredge. Taxonomy and ecological analysis was done, using several