“Chrysophyte diversity and encystment pattern”

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Global warming is one of the major challenges of the 21st century, having vital ecological, economic and political consequences. Chrysophyte stomatocyst composition is an indicator for habitat characteristics and thus can be used for assessing environmental change. Despite the recent advances, our understanding of ecological processes that drive chrysophyte diversity changes is still limited. Multidisciplinary approaches are a prerequisite to exhaust the full potential of this important indicator group. Both reconstruction of palaeoenvironmental conditions and measuring recent trends is of urgent interest to develop strategies for protecting the sensitive alpine regions. The objective of this project is to provide a basis to tap the full potential of chrysophytes as palaeoindicators by merging the strengths of ecology, palaeoecology and molecular microbiology: We propose to characterise encystment pattern in chrysopyhtes and thereby to link stomatocyst palaeoecology with ecology of vegetative cells. Samples from lakes differing in elevation, trophy and lake chemistry will be taken during different seasons and screened for chrysophyte taxa (vegetative cells) which subsequently shall be characterised morphologically and by molecular methods. The intention of the first phase of the project is to collect molecular signatures of chrysophyte taxa for linking vegetative cells to cysts (cooperation with Dr. C. Kamenik). Community composition, dominance structure and seasonal variation is in the focus of the second phase of the project. These quantitative data will also be linked to chrysophyte stomatocyst assemblages as sampled by sediment traps. In parallel, autecological laboratory experiments will be conducted to estimate basic tolerance limits and optimum growth conditions of selected chrysophyte taxa. During the terminal project phase, data will be linked to a palaeoecological data set (sediment core from Lake Oberer Landschitzsee; cooperation with Prof. Dr. R. Schmidt). Thus, classical and new as well as modern and palaeoenvironmental approaches shall be mergeed to strengthen chrysophyte functional biodiversity as a powerful indicator for environmental (climate) change. Multidisciplinarity and cross linking the strengths of different fields of research is a key issue of this proposal. The proposed project is thus embedded in the recent climate change research and specifically strongly linked to current Austrian and international research projects on chrysophyte diversity and climate change.