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Climate variability and the carbon cycle (past, present and future): Insights from the EuroCLIMATE Programme on multi-proxy reconstructions and coupled climate models at European and regional scales

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Geological archives (lake and ocean sediments, peat deposits, ice cores, cave dropstones, tree rings, among many others) contain important information on past climatic and environmental variability. The detailed study of a variety of proxy indicators in each of these archives and precise linkages between the different archives, combined with climate model scenarios, are key factors for understanding natural climate processes and the speed of climatic shifts. Together they give a detailed picture of the often dramatic impact that past climatic changes had on ecosystems and humans and allow placing contemporary global change in a longer time perspective. The message from the past moreover provides important data sets against which climate model scenarios can be evaluated.

Past climate change research involves specialists from many different fields and projects are therefore often conducted within international research networks. Smaller and larger collaborative initiatives have led to major discoveries during the past decades and many new, exciting and challenging results have emerged. Europe is home to several excellent national research centres which focus on the study of past climatic and environmental changes. Collaborative research projects which are based on bottom-up science and which allow the establishment of small to medium-sized research networks seem to be among the most successful.

Within this background the ESF launched a EUROCORES Programme “EuroCLIMATE” in 2005 and nine projects out of more than 100 proposals addressing differ-

ent aspects of past climatic changes and the global carbon cycle received funding. Based on, among others, the ongoing EuroCLIMATE project RESOLuTION (Rapid climatic and environmental shifts during Oxygen Isotope Stages 2 and 3 - linking high-resolution terrestrial, ice core and marine archives), I will attempt to show the advantages and the importance of international and interdisciplinary research collaboration from a European perspective, but also the difficulties which might arise due to the fragmentation of the European Research Area.