nutrients and pollutants. The aim of our study is to reconstruct the eutrophication history and deposition of nutrients in the sediments. The 'memory effect' of the sediment for recycling of nutrients plays a critical role in fuelling pelagic productivity and thus maintaining eutrophic conditions in enclosed seas with long water residence times such as the Black Sea.

Here we present results from sediment cores taken in the Danube River plume on shelf of the Black Sea. The dating of the sediment is somewhat hindered by irregularities in the unsupported $^{210}$Pb and $^{137}$Cs profiles. The sediment records are repeatedly interrupted by layers of stiff clay. Those clay layers show a drop in unsupported $^{210}$Pb and $^{137}$Cs and higher values of supported $^{210}$Pb. In between and below the clay layers, unsupported $^{210}$Pb and $^{137}$Cs increase again. Low values of the fallout radionuclide and of unsupported $^{210}$Pb combined with higher supported $^{210}$Pb point to a terrestrial origin of the clay. We hypothesise that the clay represents material eroded from the Danube Delta and transported to the sea in pulse-like events during flash floods of the Danube River.

### 4-2 11:20 Holzwarth, Ulrike

WESTERN SAHEL HYDROLOGY AND LAND USE OVER THE LAST THREE MILLENNIA: SEPARATING NATURAL VARIABILITY FROM ANTHROPOGENIC INDUCED CHANGES

HOLZWARTH, Ulrike[1], DUPONT, Lydie[1], MÖBIUS, Jürgen[2], ZONNEVELD, Karin A.F.[1], and SCHULZ, Michael[1], (1) Center for Marine Environmental Sciences (MARUM), University of Bremen, Leobener Strasse, Bremen, 28359, Germany, holzwarth@uni-bremen.de, (2) Institute for Biogeochemistry and Marine Chemistry, Bundesstraße 55, Hamburg, 20146, Germany

The African Sahel is a semiarid ecosystem extremely prone to precipitation fluctuations and therefore one of the most vulnerable regions of the world with respect to changes during the Anthropocene. However, the reasons for severe droughts in the 1970s and 1980s and most recently in 2010 are not fully understood. These decadal-scale variations seem to be related to temperature variations in the Atlantic and Indian Ocean and may be overprinted by anthropogenic activities. We therefore need a better understanding of past Sahelian climate variability.

With our study, we aim at disentangling land-use effects from natural variations during the Late Holocene. We present a record of the past 3100 years from a marine site off Mauritania using a combination of terrestrial and marine proxies. Pollen grains are used to reconstruct vegetation changes on the continent whereas the organic-walled dinoflagellate cysts (dinocysts) reflect local oceanographic conditions including terrigenous input. Variations between 1100 BC and 1700 AD are used as a baseline and deviations from this natural variability within the last 300 years are interpreted as anthropogenic influence.

From 1100 BC to ~ 1700 AD pollen and dinocyst associations suggest rather small changes in continental rainfall and terrestrial input. From ~ 1700 AD onward, relative abundances of the dinocyst species *Lingulodinium machaerophorum* increase continuously. This species is typical for river plume areas where fluvial input is influenced by agricultural or industrial activities. Its increase coincides with increasing dust and river fluxes recorded at the same core site which have been attributed to the onset of the commercial agriculture in the Sahel by Mulitza *et al.*, 2010. At the same time, an increase of Saharan elements in the pollen associations point to an increase in aridity but might also be interpreted as a land-use signal.

Within the time-interval of the last 70 years, a comparison with precipitation data is possible. Our data show that relative abundances of Savannah pollen as an indicator for more humid conditions decrease after the onset of the Sahel droughts in the 1970s and 1980s. This suggests that the natural hydrological variability in the Sahel region led the vegetation change during that time.

### 4-3 11:40 Heidak, Markus

ELEMENT COMPOSITION OF LAUREL FOREST ROCKS, SOILS, ROOTS AND LEAVES. IN THE FRAME OF GLOBAL CHANGE AND GLOBALIZATION IN THE ENVIRONMENT OF TENERIFE (CANARY ISLANDS; SPAIN)

HEIDAK, Markus[1], GLASMACHER, Ulrich A.[1], SCHÖLER, Heinfried[1], HERNÁNDEZ-MORENO, José M.[2], and CASILLAS RUIZ, Ramon[2], (1) Institute of Earth Sciences, University of Heidelberg, INF 234, Heidelberg, 69120, Germany, Markus.heidak@geow.uni-heidelberg.de, (2) University of La Laguna, Departamento de Edafología y Geología, Av. Asfco. Fco. Sánchez s/n, La Laguna, 38204, Spain

The endangered laurel forest on the northern slope of the Canary Island Tenerife, is exposed to different climatic conditions, variations in lithology, soils, aerosols (caused by local anthropogenic emissions), Saharan dust, and sea spray. The soils and plants of this sensitive ecosystem provide an archive that allows determining the anthropogenic influence on the biosphere in a restricted landscape environment. They store information on global change and globalization in various archives. Major urban and industrial development is located on Tenerife, and as a touristy hotspot the Island is exposed to heavy air traffic. Furthermore, the short distance to the African coastline and, therefore, to the Sahara, contribute a regular influence of African Dust emissions (ARIMOTO et al., 1995; ANTEQUERA, 1999. The element distribution allows constraining the anthropogenic influence on this ecosystem. The results are compared with data received from areas with less anthropogenic influence to define the geological background values. These data are used to understand the impact of future climate change and increased globalization to a highly sensitive Island ecosystem.

Arimoto, R., Duce, R.A., Ray, B.J.Ellis, W.G., Cullen J.D. and Merrill, J.T. 1995. Trace elements in the atmosphere over the North Atlantic. Journal of Geophysical Research,Vol.100,No.D1, 1199-1213.

Dorta Antequera, P.1999. Las invasiones de aire sahariano en Canarias. Consejería de Agricultura Pesca y Alimentación del Gobierno de Canarias, 287 pp.

### 4-4 12:00 Schneider, Anna

ORIGIN AND AGE OF THE LOWER BAVARIAN SAND-DUNES LANDSCAPE AROUND ABENSBERG AND SIEGENBURG

SCHNEIDER, Anna, Lehrstuhl Geopedologie und Landschaftsentwicklung Brandenburgische Technische Universität Cottbus, Universität Cottbus, Konrad-Wachsmann-Allee 6, Cottbus, 03046, Germany, schneida@tu-cottbus.de, DÖTTERL, Sebastien, Université de Louvain, 3, Place Louis Pasteur, Louvain-la-Neuve, 1348, Belgium, VOELKEL, Joerg, Geomorphology and Soil Science, Technical University of Munich (Technische Universitaet Muenchen), Carl-von-Carlowitz.-Platz 2, Freising-Weihenstephan, 93077, Germany, LEOPOLD, Matthias, Geomorphology and Soil Science, Technical University of Munich, Carl-von-Carlowitz-Platz 2, Freising-Weihenstephan, 85354, Germany, HÜRKAMP, Kerstin, Department für Ökologie & Ökosystemmanagement, Technische Universität München, Carl-von-Carlowitz-Platz 2, Freising-Weihenstephan, 85350, Germany, and HILGERS, Alexandra, Geographisches Institut, Universität zu Köln, Albertus-Magnus-Platz, Köln, 50923, Germany

The Lower Bavarian aeolian sand areas and sand-dune landscapes in the Abensberg/Siegenburg area (county/Landkreis Kelheim, Lower Bavaria) originated in an area where the Late Tertiary deltaic sediments of the Ur-Naab are overlain by a complex system of Pleistocene Danube gravels as well as those of the Abens river, deposited by in parts widely-shifting Quaternary river courses, mainly during the Riss glacial. This explains the absence of any significant loess cover of the area. The sand dunes and aeolian sands occurring there have been known for a long time, and their mostly late glacial age origin can be stratigraphically inferred. During the Holocene there were repeated phases of aeolian remobilisation, each of them related to an overexploitation of the carrying capacity of the landscape. It can be excluded that remobilisation was caused by changing climate. Today the dune fields, up to 10 m high, have partly been set aside as nature reserves, or are being used for agriculture and forestry. Based on geophysical prospection, at four selected dune chains and their surroundings,a distinction has been made between the underlying aeolian sand sheet, the dune cores, and younger aeolian accumulation bodies, and they have been sedimentologically characterised. The dune sands have been dated by OSL, macro-remains and the humous material of fossilised soil horizons by the radiocarbon method. Forest clearing of much of the landscape began during the Neolithic period, related to the operation of a flintstone mine at Arnhofen. Two significant phases of sand dune growth have been dated to the Bronze Age and the High Middle Ages, largely determining the aspect of the present dune landscape. There is evidence of younger remobilisation phases up to the 1950s. With reduced settlement pressure, the dunes landscape returned to a phase of morphodynamic stabilisation without any evidence of directed reforestation or dune stabilisation measures.

### 4-5 12:20 Jotheri, Jaafar Hamzah Abdulhussein

EVIDENCES OF PALEOFLOOD IN LOWER MESOPOTAMIAN FLOOD PLAIN

JOTHERI, Jaafar Hamzah Abdulhussein, Department of Archaeology, College of Arts, Al- Qadisiya University, Diwaniya 88 Iraq, jaafarjotheri@yahoo.com

The flood plain of the Euphrates and Tigris as a geological basin until the Pleistocene which then gradually filled with sediments of the rivers flowing into the Mesopotamian flood plain. According to these processes about 100-150m depth of sediments flowed into the basin and then formed the delta.

During the time of Pleistocene to Recent the rivers that flow within the flood plain changed their courses from time to time because of the subsurface structure movements and development of geomorphological process .

Usually , a flood of water is a result from the changing of rivers , the size of this water flood depending on the size of the original river ( main river or branch river ) , the season of occurrence this flood and the topography of the earth surface around the area of flooding .

In this research some evidences of a huge flooding were detected in lower Mesopotamian plain around Ancient Babylon City in middle of Iraq , this flooding resulted when Euphrates river changed its waterway in near Babylon

The evidences of this flooding were recognized in the excavated settlements that located in west Babylonian area ,the first evidence is occurrence of bed resulted from sedimentation of flooding sediments in between the human living beds of archaeological settlements . some geomorphological features still till now refer to happing of this huge flooding by recognition remains of ancient rivers and ancient marshes .

The flooding bed different in thickness from archaeological site to other may be depending on the distance of the center of flooding and the elevation of the settlement in the time of flooding . the thickness of the flooding beds were between (10 cm to 300cm ) .

The flooding bed is separate between period of human live : before flooding and after flooding , the period before flooding contain destroyed artifact and building while the bed after flooding contain creation of new buildings .

### 4-6 12:40 Makhlouf, Issa M.

SEDIMENTOLOGY AND MORPHOLOGY OF QUATERNARY TRAVERTINE

MAKHLOUF, Issa M., Earth Sciences, Hashemite University, Zarqa 13133 Jordan, makhlouf11@yahoo.com

The eastern rim of Wadi Araba in southwest Jordan displays distinct alluvial fans, which were developed since the time of formation of the Dead Sea Transform (DST), initiated in middle Miocene (Garfunkel et al., 1981). The DST fault system controlled the development of the alluvial fans and their stacking pattern. Sediments were supplied from the east and dispersed radially forming a stream-flow dominated alluvial fan system. The continuous uplift of the eastern granitic basement and overlying Phanerozoic sedimentary succession, and the active intramontane valleys whose outlets at the mountain front were elevated continuously above the piedmont plains, resulted in deposition of alluvial fans that coalesced to produce a huge bajada complex comprising of several generations of overlapping and superimposed lobes consisting mostly of granitic gravels. Eight lithofacies are identified, interpreted as representing the deposits of: proximal shallow stream and sheet floods, channelized, non-cohesive debris flows, medial heterolithic deposits, and distal mudstones and evaporites (sabkha) deposits**.**

### 4-7 13:00 Heine, Klaus

DESERT FLASH FLOOD SERIES - SLACKWATER DEPOSITS AND FLOODOUTS IN NAMIBIA: THEIR SIGNIFICANCE FOR PALAEOCLIMATIC AND ENVIRONMENTAL RECONSTRUCTIONS IN THE ANTHROPOCENE

HEINE, Klaus, Universität Regensburg, Universitätsstraße 31, Regensburg, 93040, Germany, klaus.heine@geographie.uni-regensburg.de and VOELKEL, Joerg, Geomorphology and Soil Science, Technical University of Munich (Technische Universitaet Muenchen), Carl-von-Carlowitz.-Platz 2, Freising-Weihenstephan, 93077, Germany

Progress towards a better understanding of the dynamics and deposits of Namib Desert ephemeral rivers demands an interdisciplinary approach to a large number of unresolved problems. Although many advances have been made within recent years in interpreting deposits of ephemeral desert rivers with respect to their palaeoenvironmental and palaeohydrologic information, many key issues remain to be addressed. In particular, work on fine-grained valley-fills (so called silts) has led to differing interpretations of their depositional environment, including river-end, palaeoflood and floodout deposits. Here, we present them within the concept of a hierarchical dynamic stratigraphy to investigate the relationships between heterogeneous deposits of ephemeral desert streams, using the desert flash flood series model, helping us to understand and interpret deposits of ephemeral desert streams palaeoenvironmentally.