

**(SS05) Late Quaternary environments in Southeast Asia**

**Date:** August 28

**Place:** Room 5335 (oral), Room 6302 (poster)

**Organizers:** Janelle Stevenson, Ulrike Proske, Zhen Li & Thi Mai Huong Nguyen

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**Purpose:** Southeast Asia hosts a wide range of ecosystems, from montane rainforest to coastal mangroves. Throughout the late Quaternary these ecosystems were subjected to drastic changes in environmental conditions which acted on different temporal scales (millennia to decades) and were controlled by global (e.g. sea level and climate) and local drivers (e.g. fire, alterations in geomorphology and human activity). These fluctuations in environmental parameters induced profound changes in the landscape leading to spatial and compositional adaptations of the different ecosystems. By investigating late Quaternary palaeoecological records, drivers and feedback mechanisms of ecological change become apparent which allow us to better understand ecosystem dynamics under changing environmental conditions.

This symposium invites contributions investigating the development of late Quaternary landscapes throughout Southeast Asia. It aims to bring together researchers investigating spatial and ecological ecosystem evolution and the drivers behind environmental change.

Oral Presentation

Aug. 28 [AM2] Room: 5335

Chair: Zhen Li

10:50-11:10 **A new 350 ka BP pollen record from Tianyang Maar Lake in the Southeast China: orbital-scale vegetation and climate changes** [SS05-O01 \(612\)](#)

Zhuo Zheng, Shixiong Yang, Yongqiang Zong, Kangyou Huang, Chris Brondie

11:10-11:30 **Quantifying vegetation sensitivities to the Holocene climate change with palynological data** [SS05-O02 \(290\)](#)

Hongyan Liu, Yi Yin, Qian Hao, Guo Liu

11:30-11:50 **Vegetation and climate changes of Three Parallel Rivers region since the late deglaciation based on pollen data from Lancang (Meikong) fluvial terraces** [SS05-O03 \(71\)](#)

Zhongjing Cheng, ChengYu Weng, Jianqiu Guo, Lu Dai

11:50-12:10 **Late Pleistocene sedimentary sequences and paleoclimate changes in Xunhua basin in the upper reach of Yellow River in China** [SS05-O04 \(165\)](#)

Fang Han, Kexin Zhang, Junliang Ji, Yadong Xu, Fenning Chen, Xiaohu Kou

Aug. 28 [PM2] Room: 5335

Chair: Ulrike Proske

14:30-14:50 **High-resolution Holocene climate change recorded in the Gulf of Tonkin (Beibu Bay), Northwestern South China Sea** [SS05-O05 \(283\)](#)

Zhen Li, Yulan Zhang, Anqing Lu, Bing Song

14:50-15:10 **Climate-, sea-level- and autogenic drivers for peat swamp development in Southeast Asia** [SS05-O06 \(103\)](#)

René Dommain, John Couwenberg, Alexander Cobb, Laure Gandois, Fuu Ming Kai, Charles Harvey, Hans Joosten

15:10-15:30 **Long Term (Apparent) Rates of Carbon Accumulation (LORCA) in Peatland Forest at Danau Sentarum National Park, West Kalimantan Province, Indonesia** [SS05-O07 \(11\)](#)

Gusti Z. Anshari, Evi Gusmayanti, M. Afifudin

15:30-15:50 **A 60,000 year record of vegetation change from Lake Towuti, central Sulawesi, Indonesia** [SS05-O08 \(496\)](#)

Janelle Stevenson, James M. Russell, Satrio Wicaksono

Aug. 28 [PM3] Room: 5335

Chair: Janelle Stevenson

16:20-16:40 **Pollen recorded vegetation and climate dynamics since late Quaternary from Deepor wetland-Ramsar site of Assam, Northeast India: in relevance to global climatic events and human impact** [SS05-O09 \(101\)](#)

Swati Dixit, Samir Kumar Bera

16:40-17:00 **A combined pollen and phytolith record for post-Siwalik vegetation change in Darjeeling foothill region, eastern Himalaya** [SS05-O10 \(153\)](#)

Ruby Ghosh, Dipak Kumar Paruya, Yi-Feng Yao, Cheng-Sen Li, Subir Bera

Poster Presentation

Aug. 28 [PM1] Room: 6302

13:30-14:30 **Changes of Holocene paleoenvironment of the alluvial plain in NE Taiwan inferred by lake sediments** [SS05-P01 \(558\)](#)

Liang-Chi Wang, Teh-Que Lee, Tien-Nan Yang, Jiunn-Tzong Wu, Su-Hwa Chen

SS05-O01 (612)

**A new 350 ka BP pollen record from Tianyang Maar Lake in the Southeast China: orbital-scale vegetation and climate changes**

Zhuo Zheng<sup>1</sup>, Shixiong Yang<sup>1</sup>, Yongqiang Zong<sup>2</sup>, Kangyou Huang<sup>1</sup>, Chris Brondie<sup>2</sup>

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To improve the understanding of glacial-interglacial Asian monsoon variability in low latitude East Asia, we present here a new palaeoenvironmental reconstruction from the Lake Tianyang sedimentary archive, Leizhou Peninsula, south China spanning the last c.350 ka BP. and report sedimentology and palynology alongside a new chronological framework. The pollen result shows that the arboreal taxa are composed of abundant tropical species and mixed with temperate deciduous trees suggesting a primitive flora that varied during glacial-interglacial periods. The most characteristic feature in pollen spectra since ~350 ka BP is the fundamental changes from glacial to interglacial, that the non-arboreal pollen dominates the stadials (of which Poaceae is the most

abundant taxon) and the arboreal pollen dominates the interstadials. This represents a major overall change in the vegetation composition and structure in the local – regional area, showing similar glacial – interglacial variability with South China Sea pollen, RSL and SST records. The pattern of pollen variation of the studied core is concordant with the neighboring deep sea records of northern South China Sea that the grass might be the main community covering the flat plains and the exposed continental shelf at the glacial stages. The changes of the key pollen such as the Poaceae, NAP and AP of the present analysis display a good correlation with the curve of sea level changes and SST, suggesting that the tropical ecosystem sensitively responded to the monsoon circulation controlled by global ice volume and/or sea level changes. Furthermore, strong and rapid variations were found in the last glacial cycle including MIS 4, 3 and 2, that the southward of the ITCZ and variability of precipitation during the last glacial coupled with the shallow water condition at the final stage of lake evolution must be the most important factors (Grant No. 41072128, 10lgzd08).

**Keywords:** pollen record, maar lake, long sequence, tropical vegetation, orbital scale.

SS05-O02 (290)

**Quantifying vegetation sensitivities to the Holocene climate change with palynological data**

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Semi-arid forests that are of global climatological and environmental significance have been predicted to decline under estimated climate warming in the forthcoming decades. These predictions are based on the assumption that forests respond rapidly to climate change, which has not been validated at the tree species level over long time periods. Detecting patterns and determinants of forest sensitivity to past climate change will improve the reliability of predictions of future vegetation dynamics. We systematically collected 52 Holocene pollen sequences from the monsoon-influenced northern China to reconstruct the Holocene dynamics of three main forest types mono-dominated by pine (*Pinus*), oak (*Quercus*) and birch (*Betula*), as well as steppe and desert respectively indicated by *Artemisia* and Chenopodiaceae. The sensitivities of these vegetation types to changes in both precipitation and temperature were, for the first time, calculated according to the elevation, temperature and precipitation groupings of sites, as well as the stages of climate development. Our results show individualistic, lagged and cumulative sensitivities of these taxa during the Holocene. Forests were sensitive to both temperature and precipitation during 12-5 ka BP, but their sensitivity to temperature has markedly decreased since about 5 ka BP. The differentiated sensitivities across species, time and region, were accounted for by non-directional climate change, the different climatic niches of species, and pre-existing vegetation patterns during the late-glacial. Predictions of forest dynamics under future climate change should be based on species-specific sensitivities.

**Keywords:** individualistic response, East Asian monsoon, temperate forest, climatic factors, ecological factors.

SS05-O03 (71)

**Vegetation and climate changes of Three Parallel Rivers region since the late deglaciation based on pollen data from Lancang (Meikong) fluvial terraces**

Zhongjing Cheng<sup>1</sup>, ChengYu Weng<sup>1</sup>, Jianqiu Guo<sup>2</sup>, Lu Dai<sup>1</sup>

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Located at the southeast edge of Tibetan plateau, Three Parallel River region has quite a unique topography—the longitudinal deep-cutting valleys. Such a landform behaves an important “corridor-barrier” function, and therefore climate in most valleys there is very sensitive to Indian monsoon. Meanwhile, the wide disparity in elevation induces great differentiation in vertical vegetation zones, distribution of these zones has close relationship with both the temperature and wetness, which are related to monsoon strength, Tibetan plateau effect and global climate oscillation. So vegetation and climate changes reconstruction of Three Parallel Rivers region is necessary for assessing the relative roles of those different factors on regional climate history. At least five late-Quaternary fluvial terraces (T<sub>0</sub>, T<sub>1</sub>, T<sub>2</sub>, T<sub>3</sub>, T<sub>4</sub>) are recognized in the valley of upper Lancang river in NW Yunnan Province, central part of Three Parallel Rivers region. OSL dating indicates T<sub>2</sub> was filled during the late deglaciation (14–11ka B.P.), T<sub>1</sub> in middle Holocene (7–4ka B.P.), and T<sub>0</sub> during the late Holocene (~1.9ka B.P.). Pollen analyses of these three terraces show great differences in climate during these three time intervals. T<sub>2</sub> sediments are characterized by a high percentage of pollen from *Abies*, main components of herb pollen are Asteraceae, Ranunculaceae, Polygonaceae, Graminaceae, Cyperaceae, and spores are especially abundant here. *Abies* pollen nearly disappears while *Artemisia*, Chenopodiaceae, Thymelaeaceae increase dramatically and dominate the pollen assemblage in T<sub>1</sub>. *Pinus* becomes predominate in T<sub>0</sub>, *Abies* and herb pollen percentage is relatively low in this period. Pollen data suggest a downward expansion of alpine plants, especially *Abies*, in Lancang valley during 14–11ka B.P., climate there was cold and probably wet then. Inferred from pollen assemblage similarity between T<sub>1</sub> sediments and modern surface samples at low elevation, the climate during 7–4ka B.P. was especially hot and dry with the retreat of alpine conifer forests. At about 1.9ka B.P., climate became relative mild. Increasing drought in the valley in Holocene was related to decreasing Indian summer monsoon strength and global warming trend.

SS05-O04 (165)

#### **Late Pleistocene sedimentary sequences and paleoclimate changes in Xunhua basin in the upper reach of Yellow River in China**

Fang Han<sup>1,2</sup>, Kexin Zhang<sup>1,2</sup>, Junliang Ji<sup>1,2</sup>, Yadong Xu<sup>1,2</sup>, Fenning Chen<sup>3</sup>, Xiaohu Kou<sup>2</sup>

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Compared with deep-sea sediments, ice cores and loess deposits, which could reflect global climate changes, fluvial sediments in a stable crustal uplift area could then record regional fluctuations. The third terrace of the Yellow River was well developed in Xunhua basin in the northeast margin of the Tibetan Plateau. Large-scale fluvial incision appeared to begin before 130 Ka, and the terrace was formed at ca 75 ka as dated by the optically stimulated luminescence (OSL) method. Several previous studies have suggested that the Gonghe movement (150 Ka) controlled the river incision and terrace formation. Six palynological assemblages can be defined in ascending order: *Betula-Quercus-Juglans*, *Artemisia-Quercus-Pinus-Potamogeton*, *Quercus-Pinus-Picea*,

*Artemisia-Pieca-Abies*, *Pieca-Abies-Potamogeton*, *Pinus-Pieca-Quercus*. In the late Pleistocene, the broad-leaf plants in the basin showed a trend of general decrease and fluctuations, while the xerophytic and coniferous plants increased gradually. On the basis of palynological data, compare with grain size, and magnetic susceptibility, six episodes of the climatic change were identified in Xunhua basin; they include very warm and humid period during 120-114 ka, cool and dry period during 114-105 ka, warm and humid period during 105-98 ka, gradually cooling period during 98-85 ka, warm and humid period during 85-75 ka, very cold and dry period during 75-63 ka. The six stages of climatic change recorded in Xunhua basin correspond to the marine oxygen isotope stages (MIS) of 5e, 5d, 5c, 5b, 5a and 4, respectively.

**Keywords:** palynology, optically stimulated luminescence, fluvial sediments, Tibetan Plateau, climate implication.

SS05-O05 (283)

**High-resolution Holocene climate change recorded in the Gulf of Tonkin (Beibu Bay), Northwestern South China Sea**

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Four sediment cores taken from the south area, middle area and north area of the Gulf of Tonkin in the Northwestern South China Sea were carried out sedimentary facies and pollen analysis. High-resolution climate change reveals signals of paleo-monsoon and paleo-environmental change during the late Pleistocene and Holocene. Before ~13.4 cal kyr BP, the Gulf of Tonkin (Beibu Bay) was exposed to the atmosphere and covered by grassland. Starting at ~11.7 cal kyr BP, the Gulf of Tonkin was inundated by brackish water with the sea level rise, indicated by the appearance of the brackish algae *Cleistosphaeridium*, *Sentusidinium* and *Spiniferites*, a decrease of herb content, and an increase of *Pinus*. After Hainan Island was completely separated from the Leizhou Peninsula by Qiongzhou Strait at ~8.5 cal kyr BP, a continuous marine sedimentary environment was recognized. Mangrove began to evolve along the present tidal flat of Guangxi. The current patterns were similar to those of the present, with a general trend of current homogenization reflected by gradually decreasing quantities of *Quercus* pollen and a narrowing gap between the palynological concentrations of the southern and northern parts of the region. The data suggest that three short periods of strengthened winter monsoons and currents were centered at ~6.0 cal kyr BP, ~2.7 cal kyr BP and ~0.2 cal kyr BP and two short periods of strengthened summer monsoons and currents were centered at ~7.5 cal kyr BP and ~3.4 cal kyr BP inferred from increasing in *Dacrydium* pollen.

**Keywords:** palynology, sedimentary environment, Asian monsoon, sea level rise.

SS05-O06 (103)

**Climate-, sea-level- and autogenic drivers for peat swamp development in Southeast Asia**

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Southeast Asia harbours the globally largest concentration of tropical peatlands. These peatlands form a major terrestrial carbon reservoir of 70 Pg C that is currently under severe human pressure. Here we present a comprehensive data integration of radiocarbon dated peat profiles and more than 30 basal dates of peat domes from the lowlands of Peninsular Malaysia, Sumatra and Borneo. In addition, a new multicore, multiproxy peat record from two *Shorea albida* dominated peat swamp forests in Brunei (NW-Borneo) complements our regional synthesis. These cores are the first radiocarbon dated peat records from Brunei and include high-resolution data on gamma density, magnetic susceptibility and X-ray fluorescence elemental analysis as well as data on LOI, C/N, and carbon accumulation rates. The sedimentary record is supplemented by preliminary pollen, fossil wood and charcoal analysis. In insular Southeast Asia two major peat dome regions exist: 1) coastal peat domes of Peninsular Malaysia, Sumatra and Borneo (together over 12 million ha) and 2) inland peat domes of Central Kalimantan (southern Borneo). These two regions differ significantly in timing of their origin, their successional trajectories and their carbon accumulation rates. With the onset of the Holocene the first peat domes appeared in Central Kalimantan as a result of rapid sea-level rise over the Sunda Shelf and deglacial millennial-scale changes of the Asian monsoon. These peatlands developed on terrestrial soils via paludification. Most coastal peat domes initiated between 7000 and 4000 cal BP as a consequence of a Holocene humid period over the Sunda region related to an equatorial mean position of the ITCZ and a decreased rate in the sea-level transgression. Late Holocene sea-level regression led to further peatland formation on newly emerging coastal areas, including our study site in Brunei. Coastal peatlands developed largely on mangrove deposits. This general successional pattern is corroborated by our record of geochemistry, fossil wood and pollen. Falling sea-levels led to a marked decline in peat accumulation in Central Kalimantan and together with higher ENSO variability over the last 2000 years even to cessation of peat accumulation in this region. Coastal peat domes showed resilience to stronger El Niño events. The time weighted Holocene mean carbon accumulation rate is 31.3 g m<sup>2</sup>/yr for Central Kalimantan and 77 g m<sup>2</sup>/yr for the coastal region. Southeast Asian peatlands removed carbon effectively from the atmosphere while emitting methane only at low rates and therefore had a climate cooling effect over the Holocene.

SS05-O07 (11)

**Long Term (Apparent) Rates of Carbon Accumulation (LORCA) in Peatland Forest at Danau Sentarum National Park, West Kalimantan Province, Indonesia**

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We present Long Term Apparent Rates of Carbon Accumulation (LORCA) in Peatland Forest at Danau Sentarum National Park. This long-term Carbon accumulation rate does not indicate the present accumulation rate, and it only indicates the apparent Carbon accumulation in the present peat dome. LORCA in the Nung peatland forest of Danau Sentarum National Park is determined by basal dates of radiocarbon ages of four peat cores that represent both shallow and deep peats in the Nung Peat forest. To determine total concentrations of organic Carbon and Nitrogen, we use a high

combustion method with LECO CHNS analyzer. We analyzed 430 samples to measure these CN concentrations, and measured 8 radio Carbon dates at Waikato Radio Carbon Laboratory, New Zealand. We found that peatlands in Nung peat dome have several phases of peat growth. The early phase of peat growth seemed to take place in Last Glacial Maximum. A phase of rapid peat growths occurred in the period of Late Pleistocene, when the climates were warmer and wetter than the climates in LGM. LORCA in the LGM was estimated to be  $0.12 \text{ t C Ha}^{-1}\text{a}^{-1}$ , and LORCA in the period of 13,500 – 14,900 Cal Y BP ranged 0.4 to  $0.8 \text{ t C Ha}^{-1}\text{a}^{-1}$ . Samples from the upper layers indicate dates of mid-Holocene (5,200 and 6,500 Cal Y BP). These ages might indicate the cessation periods of peat growths in the Nung peat domes in mid-Holocene. As the actual sequestration of organic matters (i.e. litters and decayed root biomass) is not studied, it is insufficient to conclude that these peats presently suffer from a degradation phase. Removals of timber in the Nung peat forest and changes of water tables due to deforestation and land use change in the up-stream of the Kapuas River would have significantly influenced the possibly current peat loss. To prove this postulate, we need to conduct further studies on peat Carbon balance and palaeo-environment in the upper Kapuas River basin.

**Keywords:** Long Term Apparent Rates of Carbon Accumulation (LORCA), radio Carbon dates, Tropical Peatlands, Danau Sentarum National Park.

SS05-O08 (496)

**A 60,000 year record of vegetation change from Lake Towuti, central Sulawesi , Indonesia**

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Lake Towuti is a large tectonic lake in central Sulawesi. The second largest lake in Indonesia, it sits within the heart of the tropical western Pacific and is perfectly situated to evaluate the terrestrial palaeoenvironment of this important climatic region. Ten piston cores, all covering approximately the last 60 kyr, were collected across the basin and all are well correlated with regard to the lithology, geochemistry and stable isotope data. The most significant result from this data so far is the positively correlated shifts in magnetic susceptibility, Fe and Cr content (major constituents of the surrounding ultramafic terrain) for the LGM which, along with stable isotope analyses, are interpreted as enhanced surface runoff under wetter conditions. However, this runs counter to existing pollen based studies for the region. The pollen record currently being developed for Lake Towuti is also problematic to interpret for this period, with a loss of gymnosperm pollen and other montane taxa and an increase in a pollen type that at this point remains taxonomically unresolved.

**Keywords:** palynology, palaeoecology, LGM, palaeoclimate.

SS05-O09 (101)

**Pollen recorded vegetation and climate dynamics since late Quaternary from Deepor wetland-Ramsar site of Assam, Northeast India: in relevance to global climatic events and human impact**

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Palynological observation of one 2.8 m deep sedimentary profile cored from Deepor wetland of Kamrup District, Western Brahmaputra flood plain of Assam, Northeast India display a chronological record of vegetation, climate and changes in wetland level as well as anthropogenic activities as a consequence of fluctuating trend of monsoon for the past 11,680 cal yrs. The presence of cool taxa, both tree and ferns, namely Lauraceae, *Ilex* and *Symplocos* along with *Gleichenia*, *Pteris pentaphylla*, etc., although in low value, signifies cool and dry climatic condition during 11,680-9,760 cal yrs BP corresponding to that of Younger Dryas cooling event. Human activity was existed and some sort of incipient Cereal based pastoral practice commenced too during these periods. This phase is further followed by a barren fluvial zone between 9,760-8,800 cal yrs BP. Fluvial activity was further succeeded by relatively less cool climate as evidenced by increment of deciduous arboreal taxa between 8,800-7,580 cal yrs BP. Later change of climate to warm and moderately humid was noticed between 7,580-1,600 cal yrs BP as proofed by relatively high frequency of marshy and aquatic taxa along with high percentage of *Shorea*, *Lagerstroemia* and *Syzygium* which is well matched with the peak period of Holocene Climatic Optimum (7,000 yrs BP) and could be attributed to increase in monsoon precipitation. The size of the wetland enhanced comparatively along with acceleration in agricultural practice. However, this long warm and humid phase was interrupted by cool and drier climate during 4,970-3,780 cal yrs BP as evidenced by high value of hinterland taxa as well as regaining of cool loving taxa. Subsequently during 1,600-850 cal yrs BP, warm and increased humid climate was observed due to high percentage of *Impatiens* and *Myriophyllum* indicating high monsoonal condition corresponding to that of Medieval Warm Period (Anderson et al. 2002). The swamp level along with pastoral practice relatively improved during this phase followed by deterioration in tropical mixed deciduous forest under warm and relatively dry climatic regime since 820 cal yrs BP onwards due to acceleration in human settlement as evidenced by sudden increment in Cereal pollen along with typical ruderal pollen taxa, *Areca catechu* and *Pediastrum* sp. (Zhang et al. 2010).

**Keywords:** agriculture practice, Younger Dryas, palaeoflood, monsoon, Western Brahmaputra floodplain.

SS05-O10 (153)

**A combined pollen and phytolith record for post-Siwalik vegetation change in Darjeeling foothill region, eastern Himalaya**

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Pollen grains and phytoliths preserved in three sections (Neora river cutting section, Mal river cutting section and Murti river cutting section) of sub-Himalayan foothill region of Jalpaiguri district explored climatic history since 46.6 Ka to present. In present study phytoliths have proved to be more effective than pollen grains in climatic interpretations and give insights into the distribution and dynamic behavior of C3 and C4 grasses and woody dicotyledonous plants after the end of Siwalik sedimentation i.e. Upper Pleistocene onwards. The combined microbotanical data suggest

that before/ during 46.6 Ka to 39.1 Ka, a warm, moist-evergreen closed forest with significant frequency of palms prevailed in the region (as revealed by both pollen and phytolith proxies). Dominance of C4 panicoid morphotypes over C3 pooid morphotypes in grass phytolith assemblages during this period is indicative of dominance of C4 grasses adapted to warm and wet climatic condition in the grass cover. C4 chloridoid grass phytoliths (adapted to warm and dry climate) were retrieved in negligible frequency during this phase. An increase of C4 morphotypes in the phytolith assemblages during 23.3 Ka suggest a further increase in C4- to C3 grass ratios implying that more C4 grasses might have occurred in the region during Last Glacial Maximum (LGM) due to the lowered atmospheric CO<sub>2</sub> level which favored growth of C4 grasses during LGM. A decrease of woody elements and corresponding increase of Chenopods and Asteraceae during the said time suggest that the region became drier than the earlier phase. A further gradual shift towards a drier and warmer condition with open forest since 5.4 Ka onwards is suggested by the occurrence of more herbaceous taxa and grasses in the palynoassemblages. The phytolith data show an increase in the ratios of C4 to C3 grasses due to further decrease of C3 pooid morphotypes and increase in C4 morphotypes. Among the C4 grass phytoliths, chloridoid morphotypes are increased significantly advocating for a warmer and drier climatic condition. Diatom spectra also show oscillations with changing climatic condition of the region since 46.6 Ka to present.

**Keywords:** climatic change, vegetation response, Pleistocene-Holocene sediments, sub-Himalayan foothill.

SS05-P01 (558)

**Changes of Holocene paleoenvironment of the alluvial plain in NE Taiwan inferred by lake sediments**

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Dahu Lake is a lowland lake located in Lanyang alluvial plain of northeastern Taiwan. In this study, we took a 35-m sediment core, DH-7B from the middle of this lake and conducted multiproxy analyses in order to infer the Holocene paleo-environment over the time of 7750 yrs -present. Most sediment samples corresponding to 7550-530 cal BP contained low pollen and diatom concentrations, but more fern spores, indicating input of riverine inorganic matters from the surroundings and a wet period. During this period, however; sediment samples corresponding to 7300-7280, 6630-6590, 4940, 4790- 4770, 4140-3690, 2040-2010, 1000-950, 530 cal BP contained higher pollen and diatom concentrations with dominance of Cyperaceae and benthic diatoms such as *Achnanthydium exiguumii*, *Staurosira construens*, *Pseudostaurosira brevistriata*, suggesting shallow or wetland habitat and drier scenario, under weak East Asian monsoon at these times. In ca. 2000 cal BP, there was drastic increase of lowland arboreal plants *Castanopsis*, *Passania*, *Lagerstroemia* as well as the appearance of riverside arboreal plant, *Barringtonia*, inferring the possible time of formation of recent floodplain. Over 310-130 cal BP, the rapidly increased frequencies of euplanktonic diatom *Discostella stelligera* suggested elevated precipitation at this time period. In recent 200 years, the elevated amount of cultivated Poaceae and open land plants, such as *Artemisia* and *Compositae*, indicated intense agricultural activity. These agree well with the historical documents of human migration for this area. The inferred changes in the paleolimnological environment were consistent with those data from mountainous lakes of nearby areas.

**Keywords:** Holocene, Dahu Lake, pollen analysis, diatom analysis, multiproxy analysis.