BELQUA Annual workshop

Friday 22 February 2019

Ockeghem Room, the Royal Academies for Science and the Arts of Belgium (RASAB), Brussels

9.30u - 10.00u	**Coffee and welcome**
10.00u - 10.20u	**Zhipeng Wu**, Qiuzhen Yin, Andre Berger, Zhengtang Guo. Different response of the Northern and Southern Hemisphere climates to obliquity and precession
10.20u - 10.40u	**Feng Shi**, Qiuzhen Yin, Irina Nikolova, André Berger, Gilles Ramstein, Zhengtang Guo. Impacts of extremely asymmetrical polar ice sheets on the East Asian summer monsoon during the MIS-13 interglacial
10.40u - 11.00u	**Hao Lu**, Qiuzhen Yin, Jia Jia, Dunsheng Xia, Fuyuan Gao. Possible link of an exceptionally strong East Asian summer monsoon to a La Niña-like condition during the interglacial MIS-13
11.00u – 11.20u	**Guoqiao Xiao**, Liting Li, Hui Gao, Qiuzhen Yin, Xiangjun Liu,Gaowen Dai. Periodic desertification of the Northeastern Tibetan Plateau and its implication for the provenance of the Chinese Loess Plateau.
11.20u – 11.40u	**Ward Swinnen**, Eline Maurer, Teun Daniels, Nils Broothaerts, Gert Verstraeten. Geomorphic controls on long-term floodplain sediment and organic carbon storage.
11.40u – 12.00u	**Katleen Wils**, Maarten Van Daele, Galderic Lastras, Catherine Kissel, Kris Vanneste, Sabine Schmidt, Frank Lamy, Giuseppe Siani. A story of crustal and megathrust earthquakes in Aysén Fjord (Chilean Patagonia) during the Holocene.
12.00u - 14.00u	**Lunch break**. Coffee and refreshments will be provided
14.00u - 14.50u	**Keynote lecture by Professor Vincent Gaffney 'Not drowning but waving! Doggerland and the Lost Frontiers Project'**
14.50u – 15.10u	**David García-Moreno**, Maikel De Clercq, Agostina Vertino, Wim Versteeg, Thomas Vandorpe, Tine Missiaen. Characterization of enigmatic groove-and-ridge landforms incised across the Dover Strait
15.10u – 15.30u	**Maikel De Clercq**, García-Moreno D, Missiaen T, Fitch S, Fraser A, Busschers F, Hijma M, Peeters H, van Heteren S, Gaffney V, De Batist, M. Deep History: Revealing the palaeolandscape of the southern North Sea

Different response of the Northern and Southern Hemisphere climates to obliquity and precession

Zhipeng Wu[1,2,3], Qiuzhen Yin[1], Andre Berger[1], Zhengtang Guo[2,3,4]

[1]Georges Lemaître Center for Earth and Climate Research, Earth and Life Institute, Université catholique de Louvain, Louvain-la-Neuve, Belgium
[2]Key Laboratory of Cenozoic Geology and Environment, Institute of Geology and Geophysics, Chinese Academy of Sciences, Beijing, China
[3]University of Chinese Academy of Sciences, Beijing, China
[4]CAS Center for Excellence in Life and Paleoenvironment, Beijing, China
e-mail: zhipeng.wu@uclouvain.be

The climate response of different latitudes in both Northern (NH) and Southern (SH) Hemispheres to the astronomical parameters during MIS-13 around 500 ka BP is studied using numerical simulation with the LOVECLIM model. A more than 90,000-year long transient simulation starting from 511 ka BP is performed with varying insolation forcing. The results of surface air temperature (SAT), sea surface temperature (SST) and sea ice are analyzed. Our results show that in the NH, precession plays a dominant role on sea ice mainly due to its response to the local summer insolation. In addition, the Arctic sea ice is also influenced, but to a lesser degree, by the northward oceanic heat transport (mainly via the Atlantic meridional overturning circulation). Precession plays also a dominant role on the SAT and SST, especially at low latitudes where vegetation, sea ice feedbacks, and also meridional oceanic heat transport are all involved. Compared to low latitudes, middle and high latitudes are more influenced by obliquity. This is partly due to the increased role of obliquity on the daily insolation towards the high latitudes, but it is also due to the increased role of the atmospheric heat transport on SAT at high latitudes. The climate response in the SH is obviously different from the response in NH. In the SH, obliquity plays a dominant role on sea ice. First, a smaller obliquity leads to lower insolation in high latitudes and finally to a cooling and more sea ice formation. Second, a smaller obliquity leads to larger latitudinal temperature and pressure gradients, and then to stronger westerly winds, which cool the sea surface and leads to more sea ice formation in the Southern Ocean. Precession is dominant in the SAT at the SH low latitudes and the driving mechanism is the same as in the NH. More details on the atmospheric and oceanic processes and feedbacks will be presented.