

## Climate changes over the last 2-3 kyrs recorded from the lake sediments in the lowland of the Maya, Guatemala

Kazuyoshi Yamada<sup>1\*</sup>, YOSHITSUGU SHINOZUKA<sup>2</sup>, Hitoshi Yonenobu<sup>3</sup>, Koji Seto<sup>4</sup>, Toshiyuki Fujiki<sup>5</sup>, Katsuya Gotanda<sup>6</sup>

<sup>1</sup>Waseda University, <sup>2</sup>Hokkaido University, <sup>3</sup>Naruto University of Education, <sup>4</sup>Shimane University, <sup>5</sup>Fukuoka University, <sup>6</sup>Chiba University of Commerce

We present time-series geochemical and pollen records from sediment cores taken at Lake Quexil in middle part, and Lake Petexbatun and Lake Las Pozas in south part of the Maya lowland, Guatemala, to reconstruct the climate and vegetation history of the region over the last two or three thousand years.

Three lakes as Lake Quexil, Lake Petexbatun and Lake Las Pozas, are on the Maya Lowland and possess sediments that preserve a highly sensitive record of past environmental changes related to ITCZ migration (e.g. Hodell et al., 2001) and human impacts concerned with the Maya Civilization (Johnston et al., 1998). In Feb 2011, we collected ten ca.4-m-length sediment cores from these three lakes by the Mackeleth core sampler.

Using the cores, we had firstly undertook a series of analysis, e.g., lithological observation, C-14 dating and sequential measurements of physical properties and paleomagnetism. By these analysis, we could build up the stratigraphy and chronology all for the core. Core chronology show that the age of bottom of sediment core of Lake Quexil, Lake Petexbatun and Lake Las Pozas reach up to 2,800, 3,600 and 1,450 cal. Years, respectively.

For reconstructing past climate changes, we measured total organic carbon (TOC), total nitrogen (TN), and total sulfur (TS) contents by CNS element analyzer as well as major and trace elements by ICP-AES with 2.3-cm interval bulk samples through the core. We use the total sulfur (TS) contents and the aluminum (Al) contents as an indicator of relative changes in the ratio of evaporation to precipitation (E/P), and total amount inputs of detritus minerals from the surroundings.

Basically, the fluctuation of TS and Al content for all sediment core has a negative correlation. These proxy records of Lake Quexil and Lake Las Pozas shows that lake level drop were observed at 300-400, around 500, 1700-1900, 2100-2300, 2400-2700 and 3000-3200 cal. years in both lakes, however, around 800 to 1,200 cal. years was occurred only at Lake Quexil. This discrepancy of such periods suggests that climate drought may not affect high evaporation in the south region. It is also clarified that drastic deforestation was observed around 10th century near Lake Las Pozas.

Keywords: lake sediments, Lake Quexil, Lake Petexbatun, Lake Las Pozas, drought, Maya Civilization