



The 12-lakes of Lu Feng, Southern China: where are the missing Lakes? Ground-Penetrating RADAR Investigation of a Coastal Plain

Jeremy Pile (1,4), Fengling Yu (2,4), Harry Jol (3), Adam Switzer (4,5)

(1) Bournemouth University, Centre for Ecology, Environment and Sustainability, Department of Life & Environmental Science, United Kingdom (jp@bournemouth.ac.uk), (2) State Key Laboratory of Marine Environmental Science, Xiamen University, No. 422, Siming South Road, Xiamen, 361005, China, (3) Department of Geography and Anthropology, University of Wisconsin - Eau Claire, 105 Garfield Avenue, P.O. Box 4004, Eau Claire, WI 54702-4004, (4) Earth Observatory of Singapore, Nanyang Technological University, 50 Nanyang Avenue, Singapore, 639798, Singapore, (5) Asian School of the Environment (ASE), Nanyang Technological University, 50 Nanyang Avenue, Singapore, 639798, Singapore

Historically known as the 12-Lakes region, the coastal plain around Lu Feng, southern China now only contains 6 major lakes. The number of lakes has apparently been reduced over time, but where have they gone? If the former lakes could be located and identified, these depositional features could hold evidence of the environmental history of the area. In June 2014, we conducted Ground-Penetrating Radar (GPR) studies to investigate the subsurface architecture of the 12 Lakes region to determine if any former lakes could be identified and located. Using a Sensors and Software Pulse EKKO 1000 system, with 100 MHz antennae mounted on a smart sled, and antenna separation fixed at 1 m, over 15 km of 2D GPR data were collected along unsealed roads and sandy/gravel forestry tracks. Data acquisition was triggered by odometer wheel, with a step size of 0.25 m. CMP data were used to establish near surface velocities for topographic correction and depth estimation. Depth of penetration was good, with maximum depth in the region of 15 m. Topographic and positioning data was collected using a combination of a laser level and a Trimble RTK GNSS system. Preliminary profile analysis indicates a large system of southerly to southeasterly dipping reflections overlying an undulating, laterally extensive, sub-horizontal reflection. These data are interpreted as a beach system prograding southerly to southeasterly over a bedrock (granite) surface and interrupted by bedrock highs, which occasionally break the surface. Along the most northern profile, the depth to the bedrock surface decreases to the north, reducing from a maximum of 10 m to less than 4 m as a result of bedrock shallowing and reduction in topographic elevation. The main west to east line reveals a section of converging dipping reflections, which delineate an area over 700 m wide and approximately 6 m deep. This particular area, which could be interpreted as the remains of one of the former lakes, would be a good target for further investigation, including coring, to gather sedimentological, environmental and dating evidence.