

## **Using Innomar SES-2000 SBP to unlock the Holocene history of Cambodia’s Great Lake – the Tonlé Sap**

**Dr. Jim Best**, et al.  
University of Illinois, USA

### **Contact**

Website     [www.geology.illinois.edu](http://www.geology.illinois.edu)  
Email        [jimbest@illinois.edu](mailto:jimbest@illinois.edu)

## Using Innomar SES-2000 SBP to unlock the Holocene history of Cambodia's Great Lake – the Tonlé Sap

Jim Best<sup>1</sup>, Steve Darby<sup>2</sup>, Pete Langdon<sup>2</sup>, Chris Hackney<sup>3</sup>, Julian Leyland<sup>2</sup>,  
Dan Parsons<sup>3</sup>, Rolf Aalto<sup>4</sup> and Mackenzie Marti<sup>5</sup>

<sup>1</sup>University of Illinois, USA; <sup>2</sup>University of Southampton, UK; <sup>3</sup>University of Hull, UK;  
<sup>4</sup>University of Exeter, UK; <sup>5</sup>Dartmouth College, USA.

Tonle Sap Lake, the largest freshwater lake in SE Asia (c. 120km long and 35 km wide), is a vital ecosystem that provides 40-60% of the protein for the population of Cambodia. The lake is fed by flow from the Mekong River that causes the lake to rise in level by c. 8m during monsoonal and cyclone-related floods, with drainage of the lake following the monsoon. Hydropower dam construction on the Mekong River has raised concerns as to the fragility of the Tonle Sap habitat due to changing water levels and sedimentation rates within the lake.

This talk will detail results of SES-2000 SBP surveys of Tonle Sap Lake in October 2014 that detailed the stratigraphy of the lake and assessed rates of infill. 250 km of sub-bottom profiles, with penetration up to 15m below the lake bed, were obtained and used to tie to cores from the north of the lake and previous literature.

The PES profiles reveal a network of valleys, likely LGM, with relief up to c. 15-20m, that have been infilled by a suite of Holocene sediments. The valley surface is picked out as a strong reflector throughout the lake, and displays a series of valleys that are up to c. 15m deep and commonly 50-200m wide, although some of the largest valleys are 1.2km in width. The Tonle Sap valley network is infilled by sediments that show firstly fluvial and/or subaerial slope sedimentation, and then by extensive, parallel-bedded, lacustrine sedimentation. Lastly, the top c. 1m of sedimentation is marked by a distinct basal erosional surface that can be traced over much of the Tonle Sap Lake, and that is overlain by a series of parallel PES reflections. This upper sediment layer is interpreted to represent sedimentation in the Tonle Sap lake due to sediment suspension settling but after a period of widespread erosion that generated the extensive erosion surface, the origin of which may indicate substantial lake drawdown. This paper will detail the characteristics and interpretation of the PES facies, their correlation to cores and estimates of sedimentation rates.