

Estimating Peat Subsidence and Carbon Emission in Drained Tropical Peatlands Using InSAR Time Series



Dr. Zhou Zhiwei

*Earth System Science Programme, Faculty of Science
The Chinese University of Hong Kong*

Tropical peatland is one of the largest terrestrial carbon stores. However, since 1970s, deforestation, drainage, fires and conversion development have increased in many tropical peatland regions. Such activities result in decomposition of the surface peat and loss of carbon to the atmosphere as CO₂. However, related quantitative estimation of CO₂ emission is limited and mainly based on field observations. Upscaling and understanding the rate of change of CO₂ emission at a regional scale through time may be accomplished using remote sensing approaches. Because drainage causes peat surface subsidence, we estimated the carbon emission in tropical peatlands in Jambi, Sumatra, Indonesia using an Interferometric Synthetic Aperture Radar (InSAR) remote sensing approach. In this study, we used two adjacent tracks of L-band ALOS PALSAR images to map the spatiotemporal land surface height changes and to estimate carbon loss and CO₂ emissions. The InSAR time series showed the following results: 1) The subsidence rate was up to 5 cm/year in plantation drainage areas; 2) The different drainage areas showed different subsidence rates due to drainage ages; 3) The largest subsidence area had an approximately 15 cm total amount of decrease in peat height within the observed time; and 4) Based on the subsidence rate data, we estimated a CO₂ emission rate of 21.41–26.26 ton/ha/yr in this region. This work demonstrates that an InSAR time series can monitor long-term peatland height changes, which is useful for carbon loss estimation in this region.

11 November 2016



11:30 a.m.



**Conference Room, 3/F,
Mong Man Wai Building**



Enquires: 3943 9624 essc@cuhk.edu.hk