

Monitoring Forest Change in China and SE Asia using Sentinel-1 SAR

European PI(s)

Mike WOODING, mikew@rsacl.co.uk

Chinese PI(s)

Dr. TAN Bingxiang, tan@caf.ac.cn

The project will bring together Chinese and European scientists and applications specialists to develop the use of Sentinel-1 SAR data for monitoring tropical and sub-tropical forests. The emphasis will be on the early detection of logging activities to control resource use as part of sustainable development. Another aspect will be the quantification of afforestation, an important process which is happening on a large scale in China to counter the carbon emissions caused by deforestation and other human activities.

The Chinese Academy of Forestry have recently begun a new project on 'Forest Cover and Above Ground Biomass Mapping in the Greater Mekong Subregion and Malaysia', primarily using optical satellite data. The Dragon 3 project will be carried out within this framework, and contribute by providing SAR-derived forest change and forest biomass maps. Demonstrations will be carried out to produce results for four or five test sites in Yunnan and Guangxi provinces and other parts of SE Asia.

The project will develop a processing chain initially using Envisat ASAR data, and later develop this to use Sentinel-1 data when available. The processing chain will include data acquisition, pre-processing, change detection, post-processing and validation/follow-up. Adaptive change detection algorithms will be developed and fine-tuned to local or regional conditions. The approach will utilise dual-polarised radar data and incorporate analysis of changes in the strength and polarisation of the radar return signal within a small timeframe (e.g. every 30 days, which is the current revisit cycle of Envisat).

The key milestones will be the annual symposia organised by ESA and NRSCC: extended working meetings in Europe or China will be organised to coincide with these, for concluding periods of work and planning future tasks. The symposium at the end of the second year will be particularly significant for mid-term reporting to ESA and NRSCC. Project deliverables will comprise papers presented at each annual symposium describing the change detection techniques developed and results achieved to date.

For Chinese participants, the on-going APFNet project will support their activities. Involvement of RSAC investigators in the first year will be internally funded, justified by linkages to an EU FP7 project concerned with tropical forest monitoring in other parts of the world. Additional funding from UK or EU sources will be sought to provide full involvement over the four years of the project.

Sheffield funding will initially be provided by CTCD-NCEO, and through Chinese support for Xichao Dong's two-year stay in Sheffield. Funding out to four years will require external support.

基于Sentinel-SAR 卫星数据的中国和东南亚热带森林变化监测

中方项目负责人：谭炳香 研究员 中国林科院资源信息所

欧方项目负责人：Dr. Mike WOODIN, RSAC, UK

本项目主要从事星载Sentinel-1 SAR数据的热带和亚热带森林监测的应用研究，由中方和欧方的科技人员共同承担完成。本项目的重点在于森林采伐行为的早期监测，以控制森林资源利用，实现资源的可持续发展。项目的另一任务是造林面积监测，因为在中国人工造林非常广泛，抵消了森林砍伐和其他人类活动造成的二氧化碳排放。

中国林科院资源信息所新近承担了项目"大湄公河次流域和马来西亚森林覆盖与地上生物量制图"，该项目主要使用光学遥感数据，本项目将在此框架下实施，提供利用SAR数据提取的森林变化信息和森林生物量图。

项目试验区位于中国的云南和广西以及东南亚地区，在这些区域选取4-5个示范试验区进行研究。

项目首先利用ENVISATASAR数据进行示范研究，开发技术流程。然后，待Sentinel-1 SAR可获取时，再利用该SAR数据进行研究。要开发的项目技术流程包括：数据获取、数据预处理、变化监测、后处理和验证。研究开发适合在地区和区域范围内使用的自适应变化监测方法，该方法将利用双极化雷达数据，以及雷达反射信号的强度和极化信息进行变化分析。

由ESA和NRSCC共同举办的每年的"龙计划"会议，以及在欧洲或中国举办的进展会议与本项目的工作计划和任务设计一致，项目将在每年的会议上提交有关变化监测技术和获得的成果的进展报告或文章。"龙计划"的中期会议非常重要，项目在此会议上提交中期进展报告。

中方参加者将与上面提到的APFNet项目紧密结合，获支持；欧方参加者将于欧盟FP7下的热带森林监测项目结合，以及UK或欧盟支持的其他项目合作以获取本项目活动支持。