

Study on the Sea-Level, Ocean Tide, Ocean Wave and Mesoscale Eddy in the Chinese Sea and Monitoring Elevation Changes of Glaciers and Lakes in Qinghai-Tibet Plateau

European PI(s)

Dr. Bernard MARTINEZ, Bernat.Martinez@isardSAT.cat

Chinese PI(s)

Dr. YANG Jungang, yangjg@fio.org.cn
Prof. LIAO Jingjuan, jjliao@ceode.ac.cn

Applications of EO data with reference to oceans and land will be studied. For oceans there are several research objectives:

- Study sea-level, ocean tide and mesoscale eddy in the Chinese sea combining ESA altimeter (ERS-1/2, ENVISAT and Sentinel-3) and Haiyang-2 altimeter data.
- Use Chinese altimeter data from Haiyang-2 to evaluate the Bohai sea level
- Compare EnviSat and Haiyang-2 algorithms for altimetry processing in order to produce a better algorithm design for both of them.
- Include HY-2 altimeter data in the evaluation of Environment Climate Variables (ECV) made during the Climate Change Innovative project.
- Include level1b corrections processing to understand their impact at level 2 and their possible improvement.
- Use SAR data from ERS-1/2 and EnviSat to measure the dynamic motions of the sea surface. Contribution

For land the main area of focus is The Qinghai-Tibetan plateau which contains thousands of small and big lakes and glaciers. Changes in the elevation of these lakes and glaciers can be an important indicator for the water and glaciers mass balance of the Qinghai-Tibetan plateau, but were until now extremely difficult to monitor. Performing continuous in situ measurements at a large number of lakes and glaciers is not feasible because of their remoteness, while radar altimetry is only capable of monitoring large lakes and glaciers. Most of the individual lakes and glaciers have little or no elevations apparently documented, and so the radar altimeter data provide the first baseline measurements of these lakes and glaciers in the vertical. Lakes and glaciers in permafrost regions are highly sensitive to changes in air temperature, snowmelt, and soil frost. In particular, the Qinghai-Tibetan Plateau is one of the most sensitive regions in the world influenced by global climate change. In this study, we use radar altimeter measurements to generate water level and glaciers elevation change time series over some lakes and glaciers in the Qinghai-Tibetan plateau and examine their relationships with precipitation and temperature changes.

中国近海海平面、潮汐、海浪与中尺度涡研究和青藏高原冰川高程与湖泊水位变化监测

欧方项目负责人： Dr. Bernard MARTINEZ, Bernat.Martinez@isardSAT.cat

中方项目负责人： 杨俊钢 博士, yangjg@fio.org.cn

廖静娟 教授, jjliao@ceode.ac.cn

开展关于海洋和陆地的地球观测数据应用研究。对于海洋研究，主要有以下几个研究目标：

- 1、 联合ESA高度计(ERS-1/2、ENVISAT和Sentinel-3)和HY-2高度计数据，开展中国近海海平面、潮汐和中尺度涡研究；
- 2、 利用中国的HY-2高度计数据评估渤海海平面；
- 3、 比较EnviSat和HY-2高度计测高数据处理算法，并给出二者更好的算法设计；
- 4、 将HY-2高度计数据应用于气候变化创新项目中的环境气候变化评价中；
- 5、 高度计1b级数据校正处理及其对2级数据的影响，以及它们可能的改进；
- 6、 基于ERS-1/2和EnviSat SAR数据的海面运动测量。

对于陆地研究，青藏高原将是主要的研究区，青藏高原分布有成千上万个大大小小的冰川和湖泊，它们的变化是反映青藏高原水资源平衡的重要指示器，但由于恶劣的生态条件而难以到达，直到目前为止，还有很多难以监测。持续且连续的仪表测量也是不可能的，只能在个别较大的冰川和湖泊上进行，因此还有许多的冰川和湖泊很少或根本就没有高程记录，所以测高技术提供了对这些高海拔、遥远且处于恶劣环境中的冰川和湖泊首次测量的机会。同时，青藏高原是全球气候变化的敏感地区，湖泊和冰川的变化与气候变化和冰雪融化等息息相关。因此，在本研究中，利用雷达高度计数据，研究青藏高原冰川高程的年际变化和湖泊水位的年际变化，为青藏高原的水资源管理提供支持，也为探讨青藏高原冰川和湖泊在全球变暖背景下的响应关系提供支持。