

Satellite Based Marine Safety and Security in the China and European Seas

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China and Europe, as the strongest economic regions, both own large coastal zones and open seas. Marine environmental safety and protection has drawn increasing concerns by both sides for those operating ports, harbours, offshore facilities and shipping over the coastal zone and around globe. One of the key terms in the field of marine environmental safety is GMES, short for Global Monitoring of Environment and Security, a joint programme of the European Commission (EU) and the European Space Agency (ESA). In order to prompt the Sino-European cooperation on monitoring marine environmental safety and protection, particularly by exploiting ESA and China EO data, we proposed this research topic. It is proposed as a continuous project from the project ID 5338 (coastal zone monitoring) in the Dragon-2 programme, while the research topic is particularly emphasized on the marine safety and protection in the new proposal. Objective of the proposal is to measure elemental marine-meteo parameters such as sea surface wind, wave and salinity, to detect oil spills from offshore platforms or hazardous and illegal substances via shipping, to monitor coastal algae blooms, and to identify ships in different sizes by utilizing the satellite observations from ESA and China sides, as well as from the third party missions (TPM), especially using the space borne microwave radar to support marine environmental safety in the China and European seas. In the framework of the cooperation from the European and Chinese scientists, innovation methodologies and algorithms will be improved and developed to derive marine-meteo parameters, distinguish man-made oil pollutions, and identify ships in different sizes from the space borne Synthetic Aperture Radar (SAR). The ground truth is very important to validate the developed algorithms. As the measurements from fixed buoys or observation stations are lack in the China Seas, campaigns using research vessels (R/V) are therefore the significant contributions to the proposed project. In the project ID 5338 of the Dragon-2 programme, we have conducted two successful campaigns in the Bohai Sea and South China Sea.

In the proposed project, we plan to deliver the prototype of innovation algorithms, as the most important element to utilize satellite data. Typical cases will be also analyzed to demonstrate the usefulness of satellite information to support for marine safety and environmental protection.

The funding to support the proposed project is mainly from three possibilities:

- 1) The respective inner funding supporting for international cooperation.
- 2) The respective research funding.
- 3) Sino-Germany cooperation funding.

基于卫星的海洋环境安全和保护 --中国海和欧洲海

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作为强势经济区域的中国和欧洲都拥有广阔的海岸带和外海。由于商港、海港、近海工程以及海岸带和全球航运等业务，双方对海洋环境安全和保护日益关注和担忧。海洋环境安全领域的关键计划之一是GMES，即环境和安全的全球监测。它是欧盟与欧空局的联合计划。为了促进中欧合作监测海洋环境安全和保护，尤其是通过利用欧空局和中国地球观测数据，我们提出此研究建议。该项目建议作为龙2计划ID5338项目的后续项目。新的项目建议特别强调海洋环境安全和保护。该建议项目的目标是测量诸如海面风场、海浪、海洋盐度等海洋大气基本参数，探测近海平台溢油或灾害以及非法航运，监测海岸带浒苔和赤潮，识别各种大小的船只。数据来自欧空局和中方以及第三方卫星数据，尤其是利用星载微波雷达数据。在中欧科学家合作框架下，改进和发展海洋大气参数反演新方法和新算法，利用星载合成孔径雷达识别人为油污染和各种大小船只。为了印证和发展算法，现场数据是非常重要的。鉴于中国海固定浮标或观测站的测量的稀少，使用海洋调查船对建议项目将十分重要。在龙2计划ID5338项目中，我们在渤海和南中国海顺利进行了2次海洋调查。

在该建议项目中，我们计划交付改进算法，它是利用卫星数据的重要基础。将分析典型案例，以演示卫星信息对海洋环境安全和保护的有用支持。

建议项目的经费支持主要考虑以下三个可能性：

- 1) 各自的国际合作经费资助
- 2) 各自的研究项目经费资助
- 3) 中德合作项目经费资助