Desertification Monitoring and Assessment Based on Remote Sensing

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Desertification has become one of the world's most serious environmental and socio-economic problems. Currently, about 40% of land area and 32% of the population face the threat of desertification all over the world. China is one of the most seriously affected countries by desertification. Mongolia is also suffering from same problem of land degradation/desertification caused by overgrazing and land use/land cover change. Therefore, it is very important to combat desertification in China and Mongolia, among which, desertification monitoring and assessment is the basis for establishing desertification early warning systems and the scientific basis for controlling desertification.

The objective of this project is to develop a quantitative and operational technique system for desertification monitoring and assessment in both China and Mongolia using ESA, Chinese and other relevant EO data in combination with climate-related and environmental data.

The project will generate:
(1) A classification approach for land use/land cover patterns mapping based on the combination of optical and radar data,
(2) Improved algorithms for sparse vegetation parameters inversion based on multi-spectral and hyper-spectral remote sensing,
(3) Determination of desertification benchmark through remote sensing, combined with climate and environment-related data at national and regional scales,
(4) The optimal indicators for desertification assessment through comparisons among vegetation fraction trend analysis, NPP scaling, RUE and its advance versions(2dRUE), as implemented in the ESA DesertWatch Extension Project,
(5) An operational desertification assessment system at the national and regional scales,
(6) Assessment of human contribution to desertification under climate change,
(7) training of young scientists in the field of desertification assessment based on remote sensing.

荒漠化遥感监测和评价

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荒漠化已成为世界上最为严重的环境和社会经济问题之一。目前，全世界约有40%的陆地和32%的人口正面临着荒漠化的威胁。中国是受荒漠化影响最严重的国家之一，蒙古国也同样遭受着由于过度放牧、土地利用/土地覆盖变化所导致的土地退化和荒漠化问题的困扰。因此，如何防治荒漠化成为中国和蒙古的重要议题，其中荒漠化监测和评估是建立荒漠化早期预警系统进而控制荒漠化进程的科学基础。

本项目的目标是基于ESA、中国和其它相关的地球观测数据，并结合相关的气象数据和环境监测数据研建一个适用于中国和蒙古的荒漠化定量监测和评价系统，计划进行如下研究工作：

（1）基于光学和雷达数据相结合的荒漠化地区土地利用/土地覆盖分类和制图技术研究；
（2）基于多光谱和高光谱遥感的稀疏植被参数遥感算法研究；
（3）基于遥感数据、气象数据和其它相关环境数据相结合的国家和区域尺度荒漠化"基准"研究；
（4）通过植被覆盖、净初级生产力（NPP）、植被降水利用效率（RUE）及其改进型（2dRUE）的趋势变化分析，研究荒漠化评价的最优指标，这也是目前实施的ESA荒漠化观测推广项目（DesertWatch Extension Project）的内容；
（5）国家和区域尺度荒漠化评价系统研建；
（6）气候变化背景下人类对荒漠化进程的影响研究；
（7）荒漠化遥感评价研究领域青年学者培训。