

### 基于遥感和GIS的青藏铁路生态累积效应研究

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### Study on Ecological Cumulative Effects of Qinghai-Tibet Railway Based on Remote Sensing and Geographic Information System

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摘要

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**摘要** 采用遥感和GIS技术,通过生态系统功能偏离累积指数、景观格局干扰累积指数、植被退化指数、生态阻隔累积指数和区域生态累积效应指数研究青藏铁路建设和运营对沿线生态系统的累积影响。结果表明,铁路建设和运营对沿线0~1 km直接影响区的生态服务功能、景观格局、植被覆盖和生态流均造成一定的累积影响,但以景观格局和生态流受到的影响最大,且对拉萨至唐古拉段的影响大于唐古拉至格尔木段,主要表现为对农田、草地、河流湿地和荒漠生态系统的影响。从铁路沿线>1~5和>5~10 km范围的间接或协同累积影响来看,拉萨至唐古拉段明显高于唐古拉至格尔木段。铁路建设运营对>1~5km范围的农田、荒漠和河流湿地生态系统仍存在一定负面影响,且以农田生态系统受到的负面累积影响最大,主要表现为拉萨和格尔木城市扩张对农田生态系统的干扰和占用。

**关键词:** 青藏铁路 生态累积效应 协同作用 遥感 GIS

**Abstract:** Cumulative impacts of construction and operation of the Qinghai-Tibet Railway on ecosystem were studied using Eco-function deviation cumulative index, landscape disturbance cumulative index, vegetation degradation cumulative index, ecological blocking cumulative index and regional ecological cumulative effect index with the aid of the remote sensing and GIS technology and on the basis of relevant research results available. Results show that the construction and operation of the railway does have some cumulative effects on the ecological service function, landscape pattern, vegetation coverage and ecological flow of the direct impact zones, 0-1 km wide alongside the railway. Its impacts on landscape pattern and ecological flow are the most significant and more on the Lhasa - Tanglha section than on the Tanglha - Golmud section, and are demonstrated mainly in farmland, grassland, river wetland and desert ecosystems. In terms of indirect or synergic cumulative impacts on the >1-5 km and >5-10 km wide zones alongside the railway, the Lhasa - Tanglha section is more significant than the Tanglha -Golmud section. Some negative effects are observed on the farmland, desert and river ecosystems in the two zones, especially the farmland ecosystem, in the form of disturbance and alienation as a result of the expansion of Lhasa and Gormud.

**Keywords:** Qinghai-Tibet railway ecological cumulative effects synergy remote sensing GIS

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