

# **Remote sensing monitoring of desertification in central Asia**

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Desertification is one of the most serious ecological and environmental problems in central Asia, and central Asia has great influence on the ecological environment of China, especially in the arid and semi-arid area of China. Based on investigation of current research and previous efforts on desertification, in this paper we propose a desertification index system suitable for large-scale desertification monitoring using remote sensing techniques. According to the desertification index design principle, we selected five desertification indexes (MSAVI, FVC, Albedo, LST and TVDI) suitable for large-scale desertification monitoring using remote sensing technique. After applying different index and index combinations on desertification monitoring and its precision evaluation in test area, the result shows that the precision of index combination of MSAVI, FVC, Albedo, LST and TVDI is superior than others. Based on analysis and comparison of current retrieval algorithms, we utilized a suitable algorithm on large scale to retrieve five desertification indexes with ten-day NOAA AVHRR data set in 1995 and 16-day MODIS data set in 2001. In term of the desertification climate types, the potential extent of desertification in central Asia was respectively divided into four categories: dry sub-humid area, semi-arid area, arid area, high and cold area. Different desertification index system was built for each area. By assessing the classification accuracies of three types of classifiers (unsupervised classifier, maximum likelihood classifier and decision tree classifier), we select decision tree classifier for desertification monitoring. Supported by desertification index system and the database of desertification indexes, the desertification status in 1995 and 2001 was classified by decision tree classifier, and analysis of desertification changes from 1995 to 2001 was also completed in study area. Statistical result according to individual country shows that the speed of desertification developing is faster than that of rehabilitating, there is a trend of development as a whole and improving locally in desertified areas in central Asia.