Monitoring Rangeland Community/Health Change Using Multispectral and Hyperspectral Satellite Data

Nadia Rochdi
Alberta Terrestrial Imaging Center, Canada

Peter Eddy
Alberta Terrestrial Imaging Center, Canada

Jinkai Zhang
Alberta Terrestrial Imaging Center, Canada

Karl Staenz
Alberta Terrestrial Imaging Center, Canada

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Nadia Rochdi , Peter Eddy , Jinkai Zhang and Karl staenz
Alberta Terrestrial Imaging Center , 401-817 4th Avenue , T1J 0P3 , Lethbridge Alberta Canada .E-mail : nadia .rochdi@ imagingcenter .ca

Key words : rangeland , remote sensing , SPOT , hyperspectral , spectral mixture analysis , decision tree

Introduction This work aims to develop new remote sensing methodology for mapping rangeland change and health indicators in the province of Alberta in Canada . Change monitoring is performed based on cover fraction at $\sim$20m pixel of the following landcover types : trees , shrubs , grasses/herbaceous , soil and water . The percent cover of plant litter , soil and noxious weed species is considered when monitoring the rangeland health .

Methods and results Various satellite data are acquired over four test sites located in southern Alberta . The broad-band multispectral (SPOT) 10m/20m data are collected at least three times during the growing season over each site while hyperspectral (Hyperion and CHRIS) data are collected at least once over each test site . Historical data for both are used to test the developed technologies for mapping rangeland change . In case of the SPOT data , the archived data goes back to 1986 and data from every 5/6 years are used . Hyperspectral data are newer and data goes back only to 2004 .

A spectral library database , including spectra of pure rangeland components and associated targets acquired in situ and in the lab , is also compiled for use in the mapping procedure . Additional parameters indicative of rangeland health such as biomass , water content , and chlorophyll are also acquired .

Discussion The methodology developed applies both the spectral mixture analysis and the decision tree to satellite data to derive the percent cover . Performances of these two methods are assessed against field ground-reference information (field data) and cover fraction maps derived from high resolution ($\sim$1/2 meter) aerial digital photos .