Automated Surface Water Thresholding Techniques Based on SAR Texture and db Backscatter Using Multi-Temporal Radarsat-2 Imagery

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Synthetic Aperture Radar (SAR) is a viable alternative data source to resolve some limitations of traditional optical sensing (e.g., cloud coverage and other atmospheric disturbances), especially where water body detection is concerned. Whereas the interpretation of radar grey scale image with significant effects of speckle noise is not a straightforward task, the SAR threshold technique can effectively facilitate distinguishing between water and land. The most critical part of this method is to determine an optimal threshold value leading to an accurate output map of open water.

In this study, a time series of calibrated Radarsat-2 data generate a summary view of the seasonal evolution of sigma naught ($\sigma^0$) for two Canadian wetland areas, Utikuma and Sheppard Slough, located in the province of Alberta. We propose two fully automated thresholding techniques in terms of texture and decibel (db) backscatter to monitor the change detection over surface water bodies. The classification accuracy of our ultimate products is validated against the high resolution optical-derived water classified maps.

**Keywords**: SAR, Sigma0, Texture, Automated Thresholding, Water Body Extraction