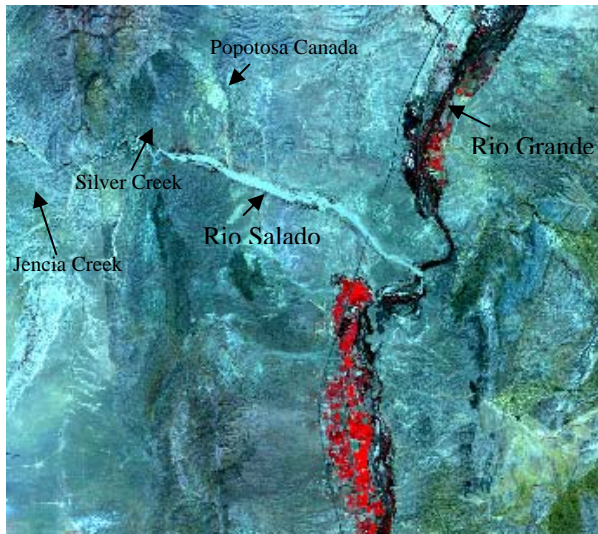# Automated Detection and Spatio-Temporal Classification of Channel Reaches in Semi-arid Southwestern US

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Abstract— Groundwater-surfacewater dynamics are strikingly different in ephemeral, intermittent and perennial channels. So it is imperative to identify their spatial distribution over a large basin for reducing uncertainties in aquifer recharges and transmission losses while performing water budget calculations. This paper describes an automated method for detection of stream channels and their classification into ephemeral, intermittent and perennial reaches using remote sensing ASTER Level 1B data. The methodology involves calculation of normalized difference water index map of the area of interest followed by bi-level thresholding to obtain watered channel network at the time of image acquisition. The aforesaid process is repeated over a set of multi-temporal images followed by application of change-detection algorithm to obtain a classified map of the channel network in reaches of different time scales.