A COMPARISON BETWEEN OPTICAL AND SAR IMAGERY FOR ESTIMATING DISCHARGE FROM RIVER WIDTH

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ABSTRACT:

The importance of river discharge monitoring is critical for e.g., water resource planning, climate change, hazard monitoring. River discharge has been measured at in situ gauges for more than a century. Despite various attempts some basins are still ungauged. Moreover, a reduction in the number of worldwide gauging stations increases the interest to apply remote sensing data for river discharge monitoring. Finding an empirical relationship between simultaneous in situ measurements and river widths derived from optical or SAR imagers has been introduced as a straightforward remote sensing alternative.

Optical images are widely used in inundation area monitoring studies because of their relatively easy processing and good temporal resolution. They suffer, though, from the effects of clouds especially in tropical area. On the other hands, SAR sensors overcome this limitation but they acquire data typically with lower temporal resolution.

In this study, to examine the difference in performance of SAR and optical images in river discharge estimation, first we will establish relationships between river discharge and river width using SAR and optic images. To do this, a number of cloud free MODIS images and ASAR ENVISAT images coincident with the in situ measurement are collected. Then, an appropriate classification scheme is applied to derive dynamic water masks. Finally, two separate empirical relationship are determined, from which we estimate river discharge. Finally, we validate our results against in situ measurements and also compare them. This test will be examined in various case studies to assess the effect of different environmental conditions on the results and also to see which source performs better.

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