

EARTH OBSERVATION SYMPOSIUM (B1)  
Earth Observation Applications and Economic Benefits (5)

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PROJECTIONS ON POTENTIAL IMPACTS OF CHANGING PRECIPITATION AND LAND COVER  
ON SEDIMENTATION IN THE PANAMA CANAL WATERSHED

**Abstract**

The essence of this project was the potential impacts of changing precipitation and land cover on sedimentation in the Panama Canal Watershed. The main objective was to observe all the anomalies between the projected land cover changes and precipitation in regards to how they affect sedimentation and run-off into the canal watershed. The main objective was completed by predicting how much growth of low and high intensity development will occur between the years 2020 and 2050 and how that growth will affect other land use in surrounding areas, i.e. cultivated land or subsistence agriculture. One methodology that was applied to this project was the Hadley Centre Coupled Model version 3 (HADCM3) which was ran with the A2 scenario to forecast the changes in precipitation for the future years desired, 2020s and 2050s. Another methodology that was utilized in this project was the global RUSLE (Revised Universal Soil Loss Equations) which provided two equations to calculate water run-off ( $Q=f(P*CN)$ ), and the mass of annual soil erosion ( $A=f(K*LS*C*P)$ ) occurring within the area of study. The months that were used to show annual precipitation were February and October, which are the wettest and driest months of the year for the canal watershed, respectively. The results that were produced from this project highlight how the increase of low and high intensity developed areas leads to an increase in water run-off which then leads to soil erosion and then increased amounts of sedimentation into the Panama Canal. Building low and high intensity development well lead to an increase in deforestation and cultivated land destroyed in surrounding areas of a watershed. Furthermore, this project showed how climate change will affect the increase in precipitation intensity which will then produce higher amounts of run-off and soil erosion in areas where land cover change has occurred. This research is important because politician's and citizen's should start now on decreasing sedimentation flow into the Panama Canal. The canal offers a large portion of Panama's economy so if sedimentation starts filling the canal larger ships will not be allowed to pass through the canal. One way to fix the sedimentation once in the canal is to dredge which cost money and waste time for the ships that want to pass through but can not when the canal is being dredge.