



UNIVERSITY OF THE PHILIPPINES

**SIMULATED IMPACT OF LAND COVER CHANGE ON  
PHILIPPINE SEASONAL CLIMATE**

By

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## ABSTRACT

### “Simulated Impact of Land Cover Change on Philippine Seasonal Climate”

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Land use/Land cover change (LULC) is considered as one of the major factors that greatly affects regional or global climate because it alters the biophysical parameters of the land surface; hence, it influences the partitioning of heat fluxes that contributes much to the development of planetary boundary layer. In this study, Regional Climate Model 3 (RegCM3) was used to simulate the impact of a 100-year land cover change in the Philippines seasonal climate using NCEP/NCAR Reanalyzed Data (NNRP2) for 2005-2007. The model used a one way nesting of 45 km for the bigger domain and 15 km for the smaller domain centred on the Philippines. Results show three types of land cover change such as forest to crop, forest to grass and crop to urban. Paired sample t-test was used to determine the significance of the difference in output between the past and present land cover simulations. Crop to urban consistently affected the Philippine climate with an increase of 0.1-1.2 degree Celsius; this was accounted for by increase in sensible heat flux and longwave radiation corresponding to a decrease in absorbed radiation. Forest to crop showed a cooling trend of 0.1-0.8 degree Celsius due to the presence of water during irrigation that was assumed in the model. Forest to grass showed a warming trend of 0.1-0.5 degree Celsius. In all land cover change type, the wind speed increased because of the decrease in roughness length. The effect of LCC on precipitation was more complex, though generally, rainfall increased by 0.2-3.0 mm/day in the forest to crop change while in the crop to urban and forest to grass, rainfall decreased by 0.2-0.6 mm/day and 0.5-0.9 mm/day, respectively. The changes in these parameters happened after the 100 year change in the land cover of the country. The result also showed that the impact of land cover change on the simulated climate variables differed from the observed normals. In view that the dynamics of land cover change and synoptic scale forcings can affect climate parameters, which are likely to cause feedback on the climate system in island country like the Philippines, further investigation should be undertaken.

Keywords: RegCM3, Land Cover Change.