World Academy of Science, Engineering and Technology
International Journal of Environmental and Ecological Engineering
Vol:11, No:01, 2017

# Characteristics of Old-Growth and Secondary Forests in Relation to Age and Typhoon Disturbance

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**Abstract :** Both forest age and physical damages due to weather events such as tropical cyclones can influence forest characteristics and subsequently its capacity to sequester carbon. Detangling these influences is therefore a pressing issue under climate change. In this study, we compared the compositional and structural characteristics of three forests in Taiwan differing in age and severity of typhoon disturbances. We found that the two forests (one old-growth forest and one secondary forest) experiencing more severe typhoon disturbances had shorter stature, higher wood density, higher tree species diversity, and lower typhoon-induced tree mortality than the other secondary forest experiencing less severe typhoon disturbances. On the other hand, the old-growth forest had a larger amount of woody debris than the two secondary forests, suggesting a dominant role of forest age on woody debris accumulation. Of the three forests, only the two experiencing more severe typhoon disturbances formed new gaps following two 2015 typhoons, and between these two forests, the secondary forest gained more gaps than the old-growth forest. Consider that older forests generally have more gaps due to a higher background tree mortality, our findings suggest that the age effects on gap dynamics may be reversed by typhoon disturbances. This study demonstrated the effects of typhoons on forest characteristics, some of which could negate the age effects and rejuvenate older forests. If cyclone disturbances were to intensity under climate change, the capacity of older forests to sequester carbon may be reduced.

**Keywords :** typhoon, canpy gap, coarse woody debris, forest stature, forest age
**Conference Title :** ICEEB 2017 : International Conference on Ecology and Environmental Biology
**Conference Location :** London, United Kingdom
**Conference Dates :** January 19-20, 2017