

A global eco-environmental vulnerability map by utilizing essential datasets

*Yuei-An Liou¹, Anh Kim Nguyen¹

1. National Central University

Eco-environmental protection and management on a global scale are of a challenging task since it requires comprehensive spatiotemporal datasets of various influential factors, which are mainly subject to complex interactions between human and nature. Determining, quantifying, and visualizing the spatial distribution of human and natural impacts are vital for the global eco-environmental protection and restoration. In this study, an assessment framework is proposed to produce a global eco-environmental vulnerability map based on essential datasets. The assessment is realized by using multi-indicators that are categorized into three groups, namely human activities, climate conditions, and natural hazards. The three groups of various influential factors are given specific weightings individually and synthesized to decide the level of eco-environmental vulnerability for spatial distribution on the maps. The vulnerability is divided into six levels, *potential*, *light*, *slight*, *medium*, *heavy*, and *very heavy*. Results show that eco-environmental vulnerability of significant levels (*very heavy* and *heavy*) is only seen sparsely in many areas of the globe, but intensively in the Asia. In another word, except for Asia, a significant portion of the European, American, and Polar regions remain in *medium*, *slight*, *light*, and *potential* vulnerability levels. Global eco-environmental vulnerability profile provides critical information for local, regional, and global decision makers to plan, manage, and implement necessary actions to lessen the impacts of nature and humans on eco-environment.

Keywords: eco-environmental vulnerability, global essential dataset, eco-environmental protection

A global eco-environmental vulnerability map by utilizing essential datasets

Yuei-An Liou^{1,2} and Anh Kim Nguyen^{1,2,3}

¹Center for Space and Remote Sensing Research, National Central University,
No. 300, Jhongda Rd., Jhongli District, Taoyuan City 32001, Taiwan, R.O.C.

²Taiwan Group on Earth Observations, Hsinchu, Taiwan, R.O.C.

³Institute of Geography, Vietnam Academy of Science and Technology,
18 Hoang Quoc Viet Rd., Cau Giay District, Hanoi Viet Nam

Eco-environmental protection and management on a global scale are of a challenging task since it requires comprehensive spatiotemporal datasets of various influential factors, which are mainly subject to complex interactions between human and nature. Determining, quantifying, and visualizing the spatial distribution of human and natural impacts are vital for the global eco-environmental protection and restoration. In this study, an assessment framework is proposed to produce a global eco-environmental vulnerability map based on essential datasets. The assessment is realized by using multi-indicators that are categorized into three groups, namely human activities, climate conditions, and natural hazards. The three groups of various influential factors are given specific weightings individually and synthesized to decide the level of eco-environmental vulnerability for spatial distribution on the maps. The vulnerability is divided into six levels, *potential*, *light*, *slight*, *medium*, *heavy*, and *very heavy*. Results show that eco-environmental vulnerability of significant levels (*very heavy* and *heavy*) is only seen sparsely in many areas of the globe, but intensively in the Asia. In another word, except for Asia, a significant portion of the European, American, and Polar regions remain in *medium*, *slight*, *light*, and *potential* vulnerability levels. Global eco-environmental vulnerability profile provides critical information for local, regional, and global decision makers to plan, manage, and implement necessary actions to lessen the impacts of nature and humans on eco-environment.

Index terms: eco-environmental vulnerability; global essential dataset; eco-environmental protection