Habitat and Environment of Islands: Primary and Supplemental Island Sets

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OVERVIEW

Islands have long been an object of scientific interest. Notably Charles Darwin, while on the round-the-world voyage of the Beagle (1831–1836), developed his ideas on biological evolution following his speculations on the isolation of various species on the Galapagos Islands in the Pacific Ocean and on the biophysical evolution of coral atolls upon visiting the island of Cocos-Keeling in the Indian Ocean. In the succeeding years, a large body of literature on islands has developed, primarily within the disciplines of geology and biology. The summary account by MacArthur and Wilson (1967) remains an excellent introduction to biogeographic theory of islands. Menard (1986) provided a summary account of the geologic evolution and demise of islands, particularly oceanic islands and islands in island arcs. Nunn (1994) placed island studies within the context of current interest in global change. Island-based studies can provide a framework approximating natural, controlled scientific experiments — the isolation of various properties of islands to study the effects on those properties through the relations of other properties, endogenous or exogenous, to the islands — a process referred to in engineering as "defining a free-body cut."

To develop an island framework useful for interdisciplinary island-based studies, a general synthesis along multidisciplinary lines of the world's "saltwater" islands was undertaken on the basis of a Primary Island Set of 1,000 specific islands characterized by 122 parameters. The suitability of the synthesis is enhanced by including information on islands that belong to two Supplemental Island Sets — A, which consists of 386 islands characterized by 14 parameters, and B, of 368 islands characterized by 17 parameters. A detailed description of the parameters, their coverages of the islands, and the values of the parameters structured for various disciplines follows.

The sample space for selecting islands to form the Primary Island Set was bound as follows:

- Excluded from the sample space were islands within freshwater bodies, lakes, and rivers, and (or) on continents or on islands, as well as islands that are parts of the deltas of rivers that discharge to the sea;
- Grønland (Greenland), which is generally considered to be the world's largest island, was preselected, thereby fixing the upper bound on the areal size of any island;
- No limit was imposed on the lower bound of the areal size of an island;
- Dry-lagoon atolls, particularly raised atolls, and islets of atolls, but not atolls per se, were considered to be within the sample space;
- In the case of two islands separated by a "narrow" and "shallow" channel, if one island was selected, then the other also was selected — this conditional selection avoided the establishment of accurate criteria on the width and depth of channels for judging whether two islands were considered to be effectively one, information that in some cases would be difficult to obtain;
- Along continental margins, islands that mark the outer oceanic extent of archipelagos were considered, but allowing for the selection of an exceptionally large "interior" island whose area makes up a large proportion of the total area of the archipelago, and