Primary succession of tropical vegetation illustrated using New Guinea volcanoes

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New Guinea: island of volcanoes
Volcanic activity and earthquakes on the point of contact between tectonic plates.
New Guinea: an island on the tectonic divide

Pigram & Davies 1987
Manam Island
Manam island

Early primary succession on lava flows dominated by *Casuarina* and *Pandanus*
Around 1650s, the volcano caldera collapsed after a huge explosion (3-4 largest on Earth during past 2000 years), creating Lake Wisdom. In 1950s, a small volcanic Motmot island emerged from the lake. The succession was returned to the starting point during volcanic activity in 1968. Modern records of volcanic activity date from 1933, 1938, 1943, 1953, 1955, 1968, 1973, 1976 and 1993. Reports on the activity before 1930s survived only as folk legends, including a rather precise account of the 1650s explosion.
Primary succession
Motmot Island

A: Cerisy Peak on Long Island
B: Motmot Island in the lake
C - H: The results of 50 years of primary succession:
*Imperata cylindrica* grass (G),
*Blechnum dentatum* fern (F, H),
*Tridax procumbens* herb (E).
*Cyperus polystachyos* (not shown) is also important early successional species on the island.

From Thorton et al. 2001 *J. Biogeogr.* 28:1311
Karkar Island 30 yr old succession on a lava flow: a closed forest rich in palms and vines
Primary succession

Krakatau: before … and after 1883
Coastal primary succession on Krakatau Islands:

Simplified: alternative paths all start with *I. pes-caprae* but then include

(i) *Casuarina* as the final stage

(ii) *Casuarina*/*Terminalia* transitory & *Ficus pubinervis* the final stage

(iii) *Terminalia & Barringtonia* as the final stage


Note that the photos are illustrative of plant species, but are not from Krakatau Islands.
Inland primary succession on Krakatau Islands:

Anak Krakatau island: succession is delayed

*Casuarina* coastal successional stage on Anak Krakatau