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Scott Fitzpatrick



Atholl Anderson



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Geography

Geographic Names

Indo-Pacific (Indian and Pacific Ocean Islands)

Oceania (combines Polynesia, Melanesia, Micronesia)

near Oceania (Solomons and west)

remote Oceania (east of Solomons)

Indo-Malaysian Archipelago (Indonesia, Insular Malaysia, Brunei, Timor Leste)

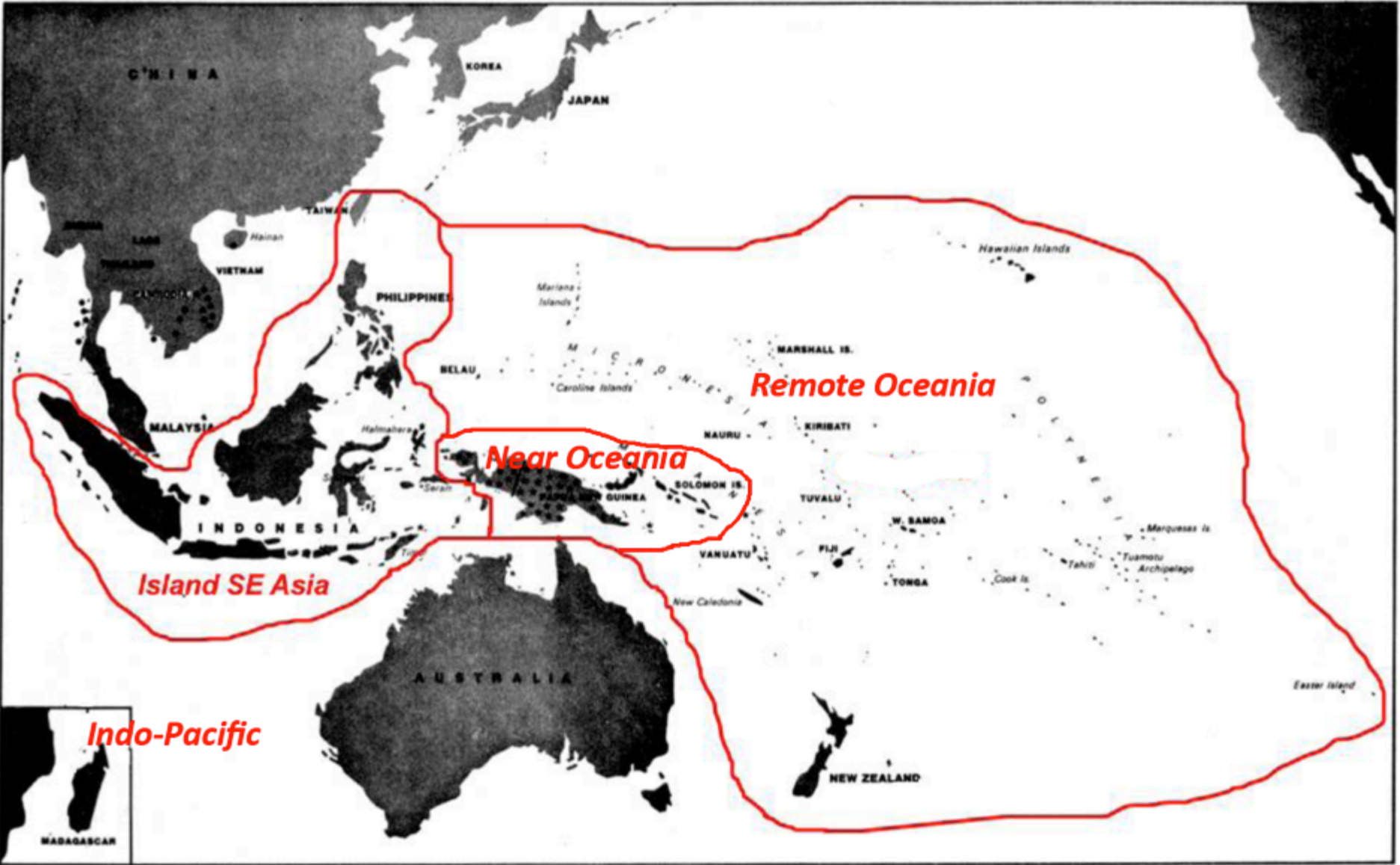
Island Southeast Asia (Indonesia, Insular Malaysia, Brunei, Timor Leste plus the Philippines)

Sunda (Pleistocene mainland Southeast Asia)

Sahul (Pleistocene mainland Australia-New Guinea)

Wallacea (land between Sunda and Sahul, which were islands even at Last Glacial Maximum 20-25kya)

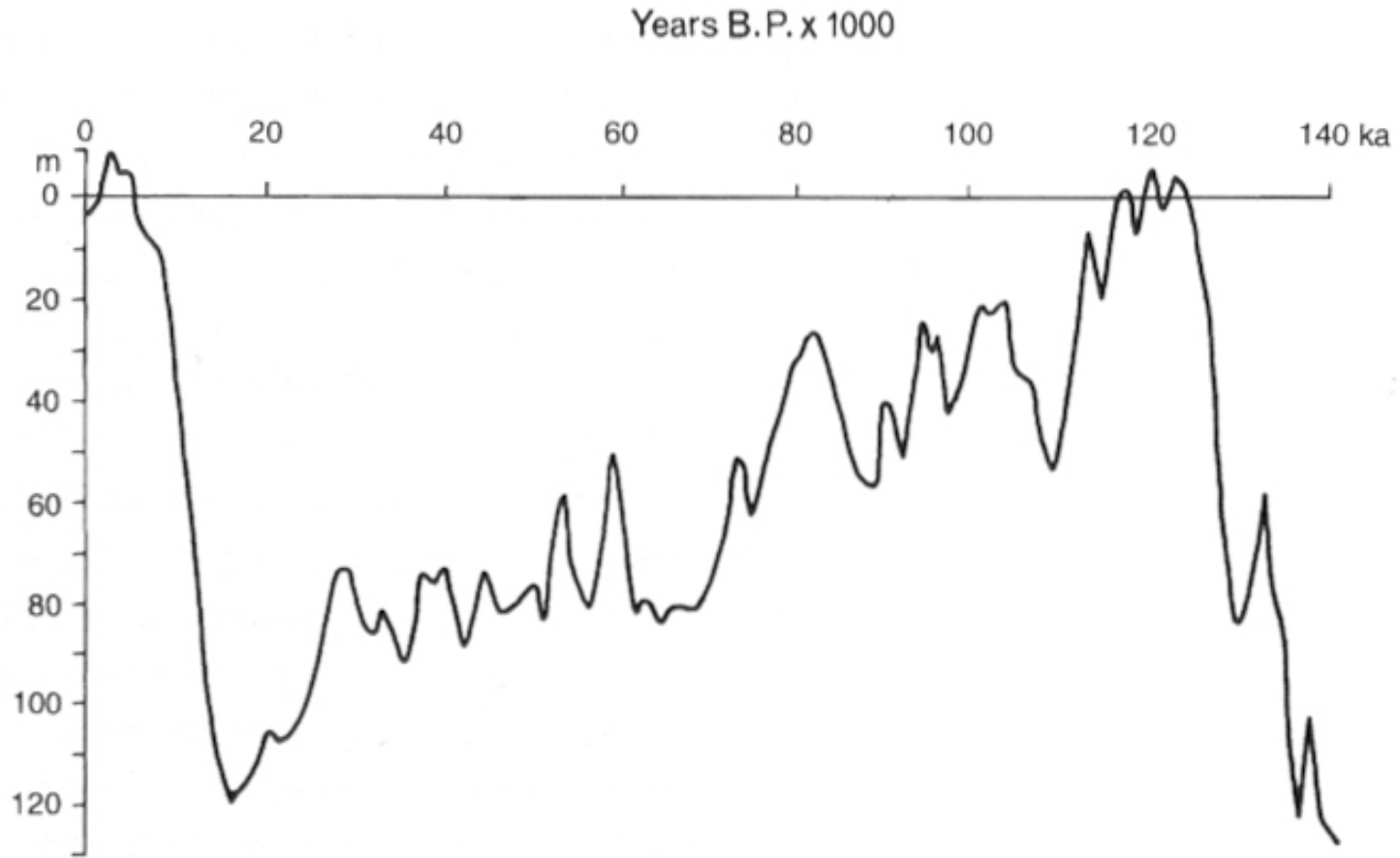
Regional names—Indo Pacific



Pleistocene continents and Wallace's line



Pleistocene-Holocene sea level changes



Biogeographic distribution of key animal species

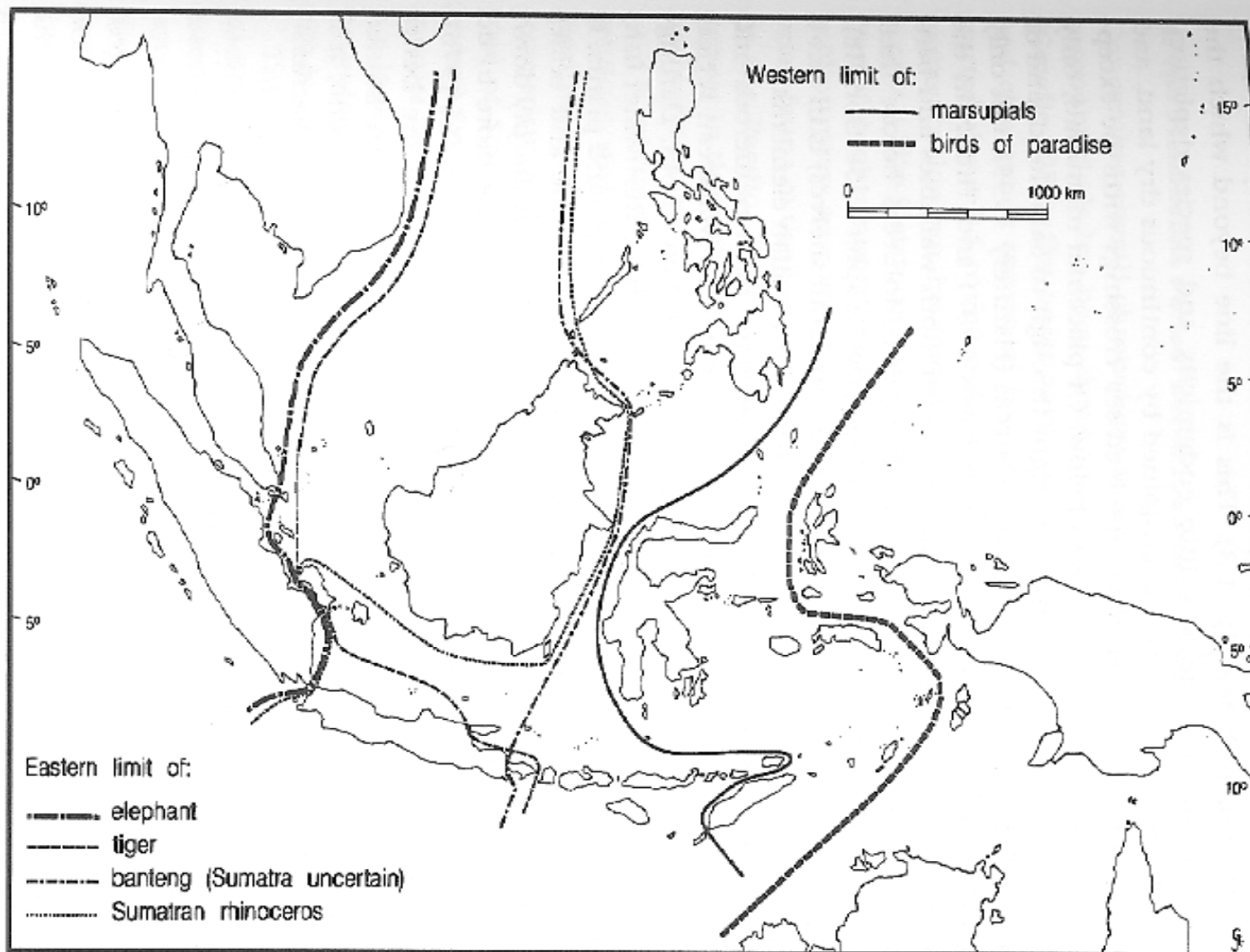
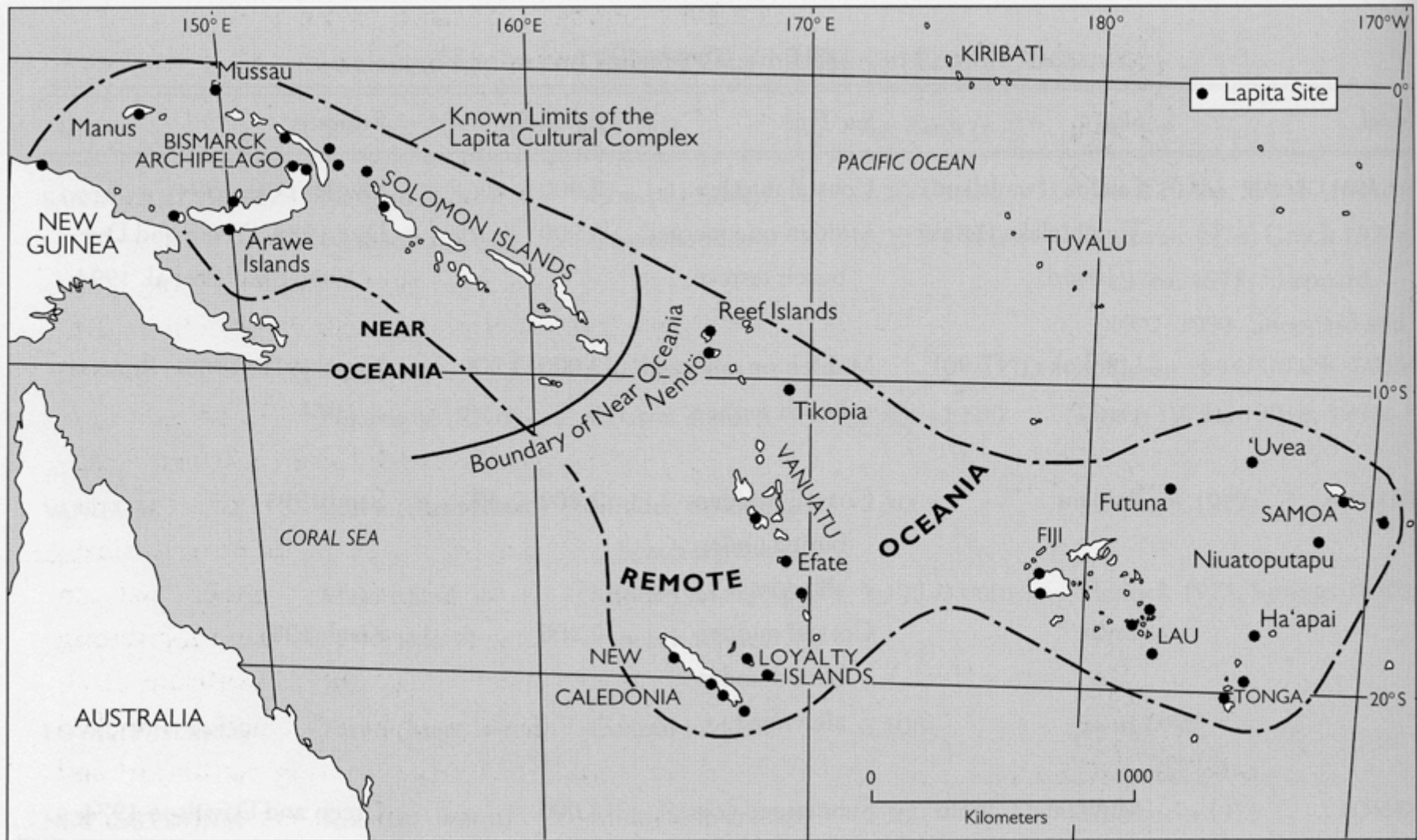


Fig. 1.5 The boundaries of some selected animal species in the Indo-Malaysian Archipelago. The Javan rhinoceros (*Rhinoceros sondaicus*) occurs on Sumatra and Java but not Borneo, where the Sumatran rhinoceros (*Dicerorhinus sumatrensis*) occurs alone today (but see Chapter 6, Section IIB). After Atlas 1936, Blad 7b.



Near and Remote Oceania-detail

Culture Areas (D'Urville 1832)

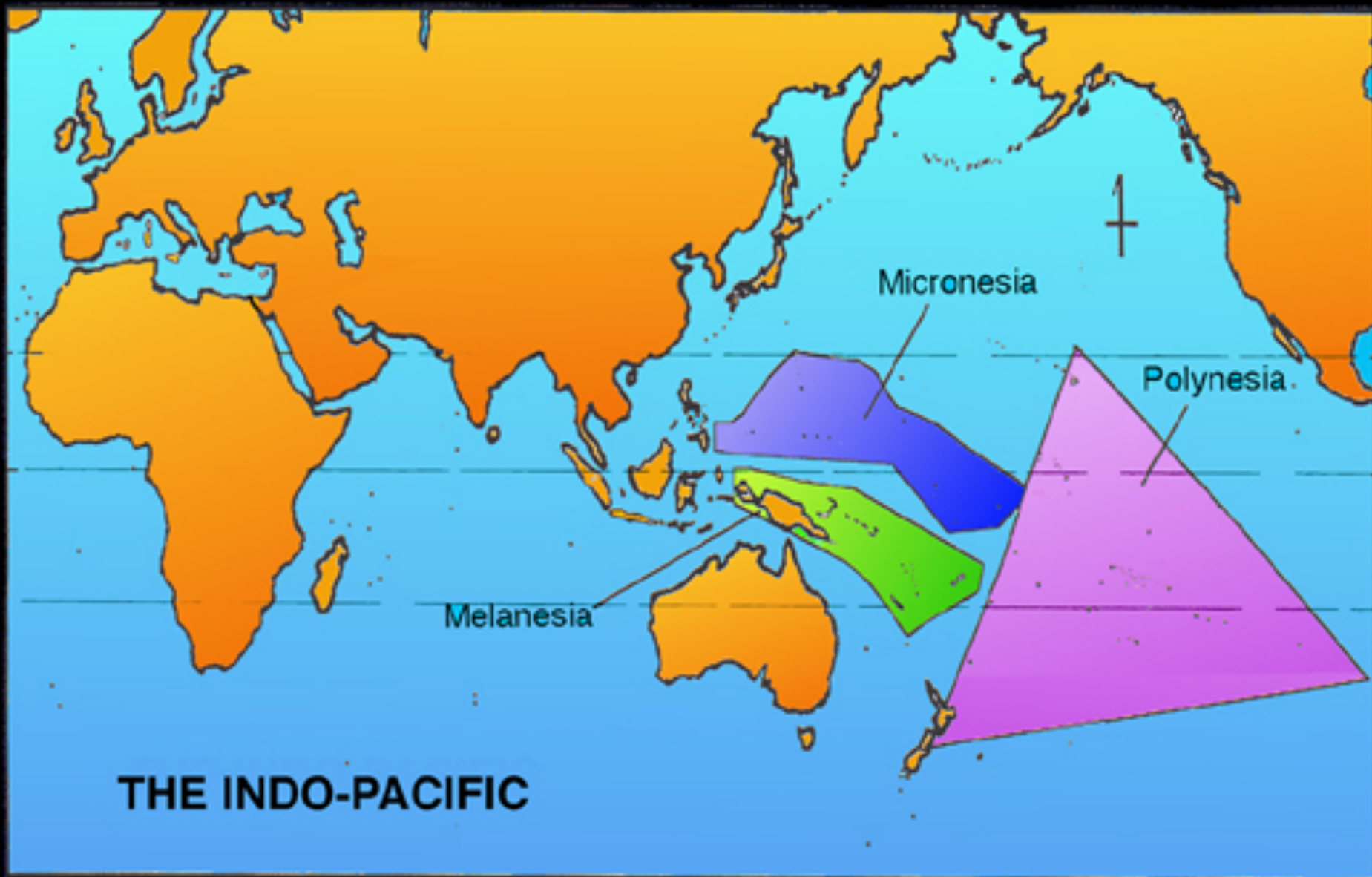
Polynesia (“many islands”)

eastern Polynesia

western Polynesia

Melanesia (“dark islands”)

Micronesia (“small islands”)



Micronesia

Polynesia

Melanesia

THE INDO-PACIFIC

Linguistic areas

Austronesian language family

Oceanic

Eastern Polynesian

Western Polynesian

Malayo-Polynesian

Central Malayo-Polynesian

Western Malayo-Polynesian

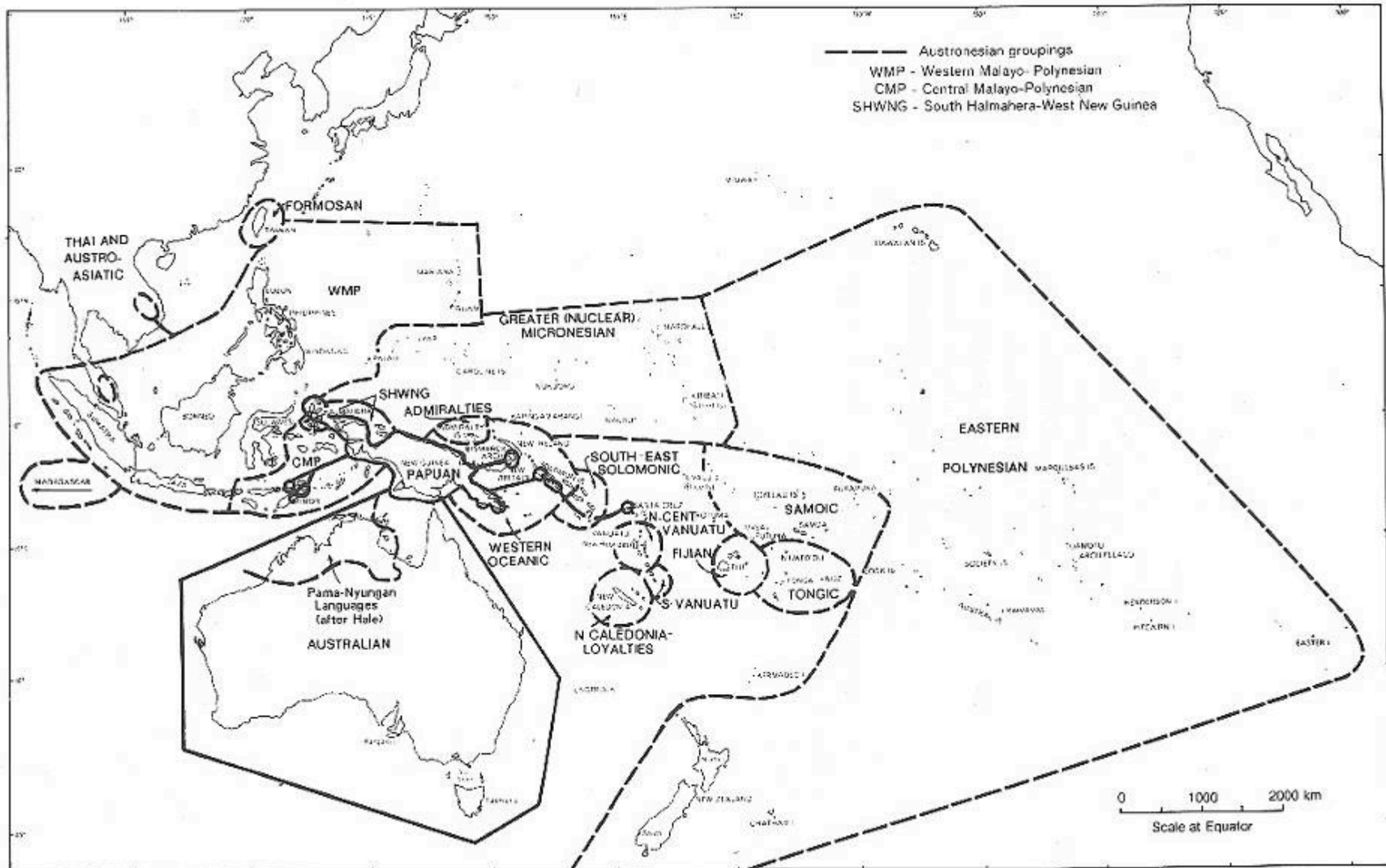
Non-Austronesian (Papuan)

Trans-new Guinea Phylum

West Papuan Phylum

East Papuan Phylum

Austronesian and Papuan languages



Political/State Names

Indonesia

Malaysia

Papua New Guinea

Fiji

Samoa

Federated States of Micronesia

etc.

Political boundaries, Island Southeast Asia



Timor Leste (post 1999)

Bellwood 1997

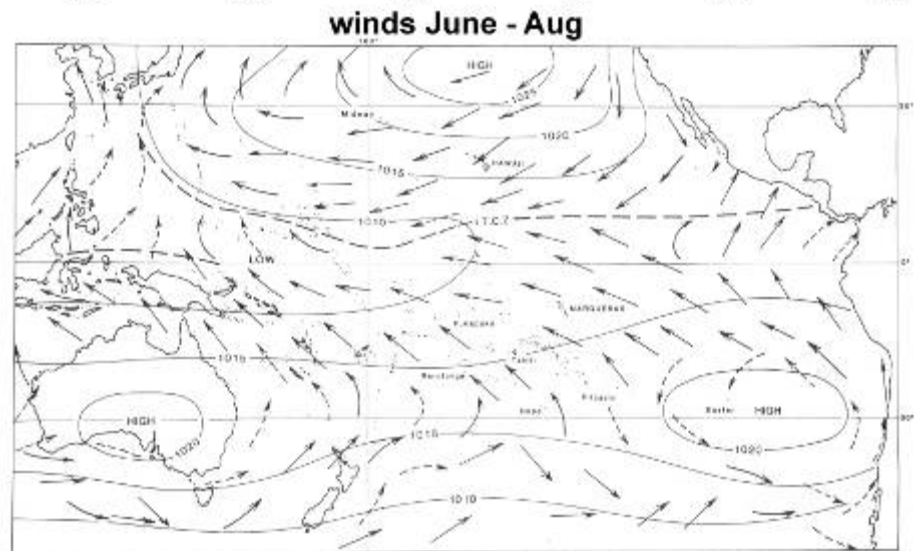
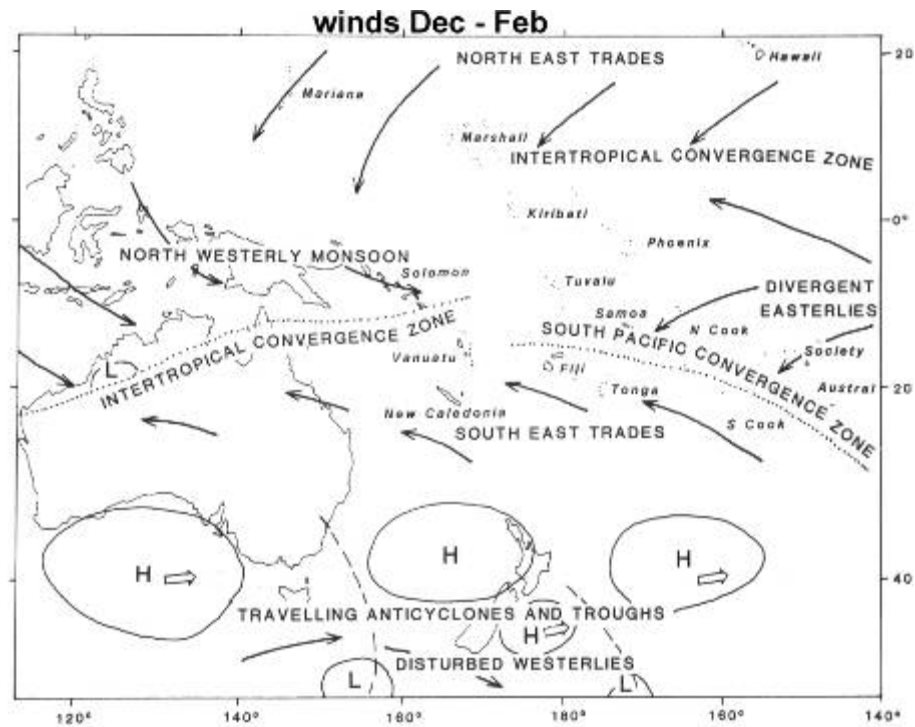
Political boundaries, Oceania





Weather and Climate

Wind directions/seasons



ITCZ (Inter-Tropical Convergence Zone)



Julian P. Sachs is an associate professor of oceanography at the University of Washington. His laboratory focuses on developing and applying molecular and isotopic techniques to decipher climate, geochemical and biochemical processes over the past 2,000 years.



Conor L. Myhrvold, a geoscience major at Princeton University, was a fieldwork assistant and photographer for Sachs on recent expeditions.

CLIMATE CHANGE

A Shifting Band of Rain

By mapping equatorial rainfall since A.D. 800, scientists have figured out how tropical weather may change through 2100

By Julian P. Sachs and Conor L. Myhrvold

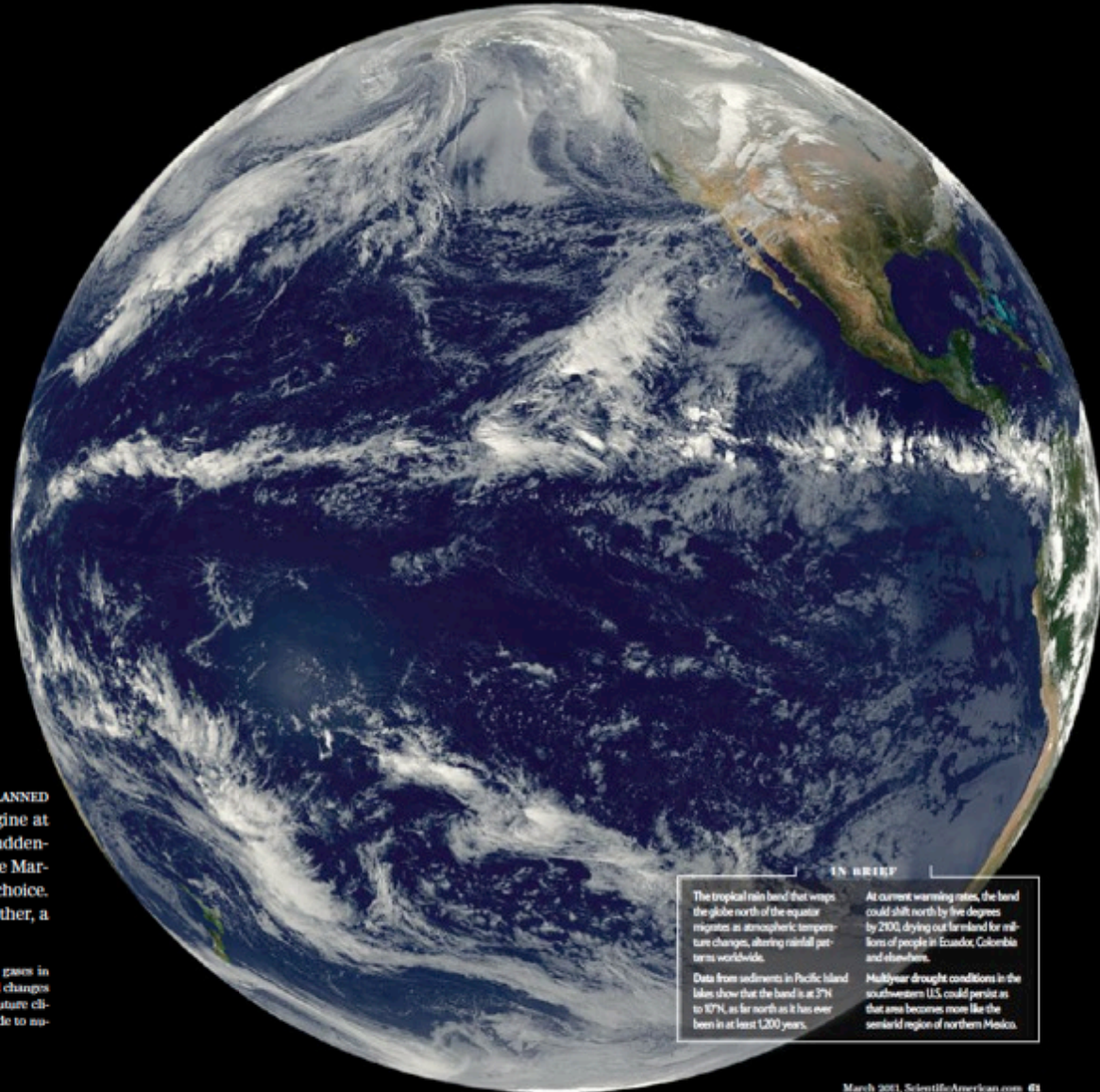
T

HE FIRST INDICATION THAT OUR EXPEDITION WAS NOT GOING AS PLANNED was the abrupt sputter and stop of the boat's inboard engine at 2 A.M. The sound of silence had never been less peaceful. Suddenly, crossing the open ocean in a small fishing vessel from the Marshall Islands in the North Pacific Ocean seemed an unwise choice.

A journey to a scientific frontier had led us to a different frontier altogether, a vast darkness punctuated by the occasional lapping wave.

We are climate scientists, and our voyage (which ended safely) was one of many intended to help us do what at first glance seems impossible: reconstruct rainfall history back in time, across an ocean. By tracing that history, we can gain a better understanding

of how the ongoing buildup of greenhouse gases in the atmosphere, rising air temperatures and changes in tropical precipitation are likely to alter future climate patterns. We have traveled far and wide to numerous islands across the Pacific Ocean.



IN BRIEF

The tropical rain band that wraps the globe north of the equator migrates as atmospheric temperature changes, altering rainfall patterns worldwide.

Data from sediments in Pacific Island lakes show that the band is at 3°N to 10°N, as far north as it has ever been in at least 1,200 years.

At current warming rates, the band could shift north by five degrees by 2100, drying out farmland for millions of people in Ecuador, Colombia and elsewhere.

Multiyear drought conditions in the south-western U.S. could persist as that area becomes more like the semiarid region of northern Mexico.

Asian Monsoon

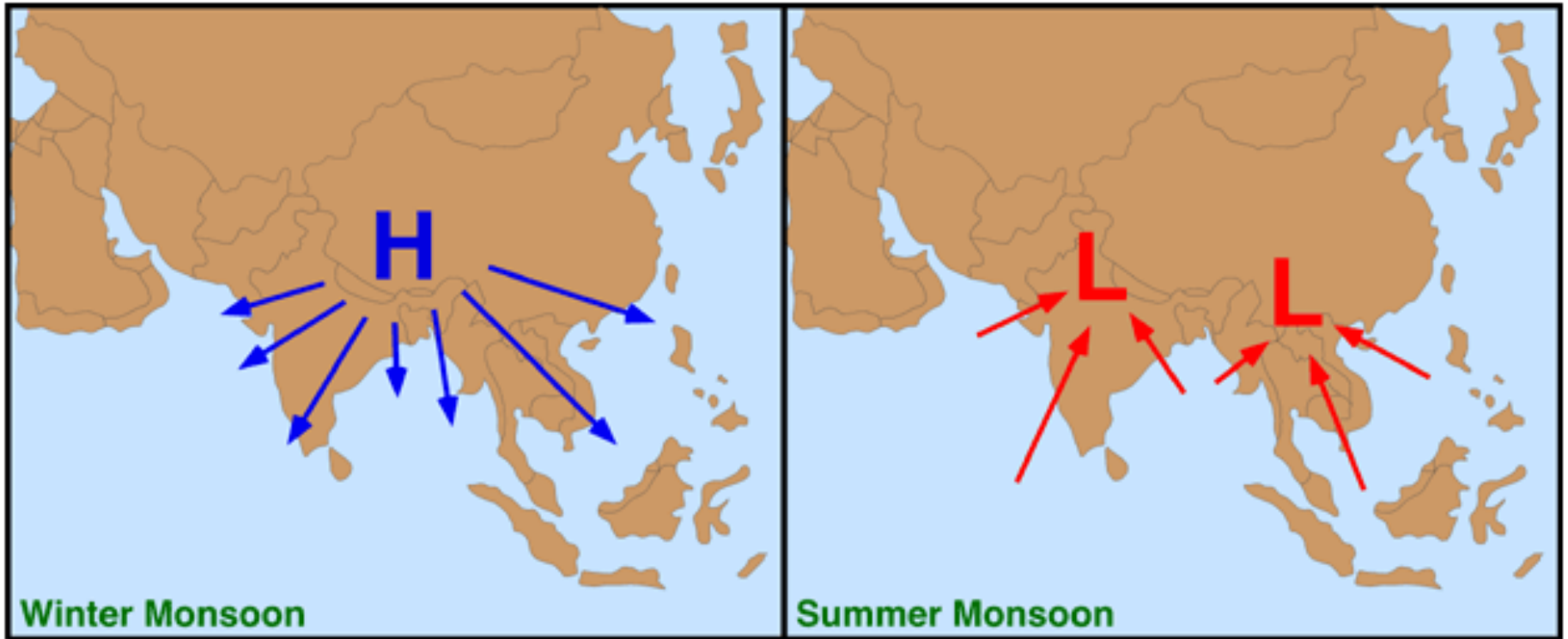


Figure 7o-8: Winter and summer monsoon wind patterns for southeast Asia.

Wind directions/seasons—SE Asia

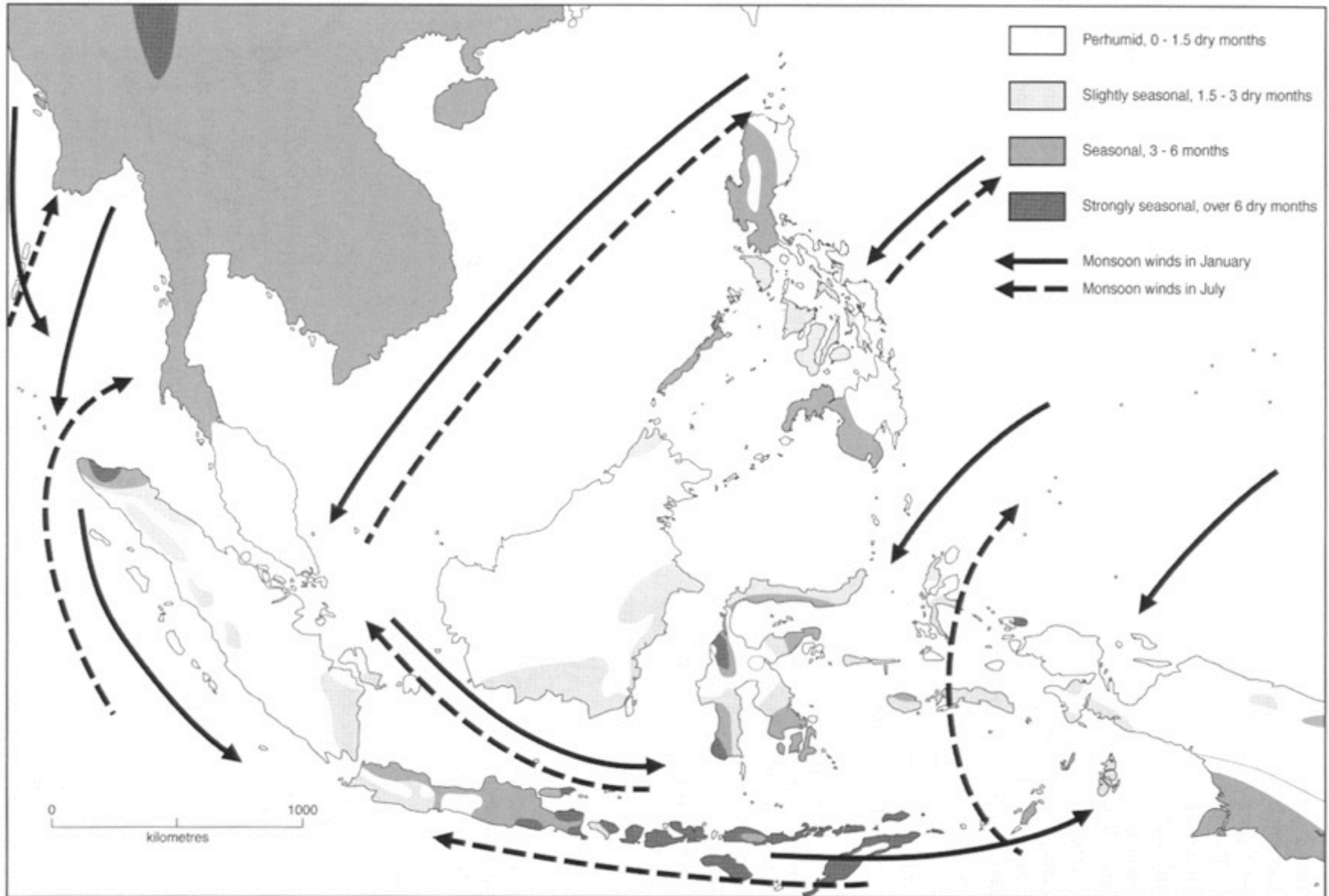
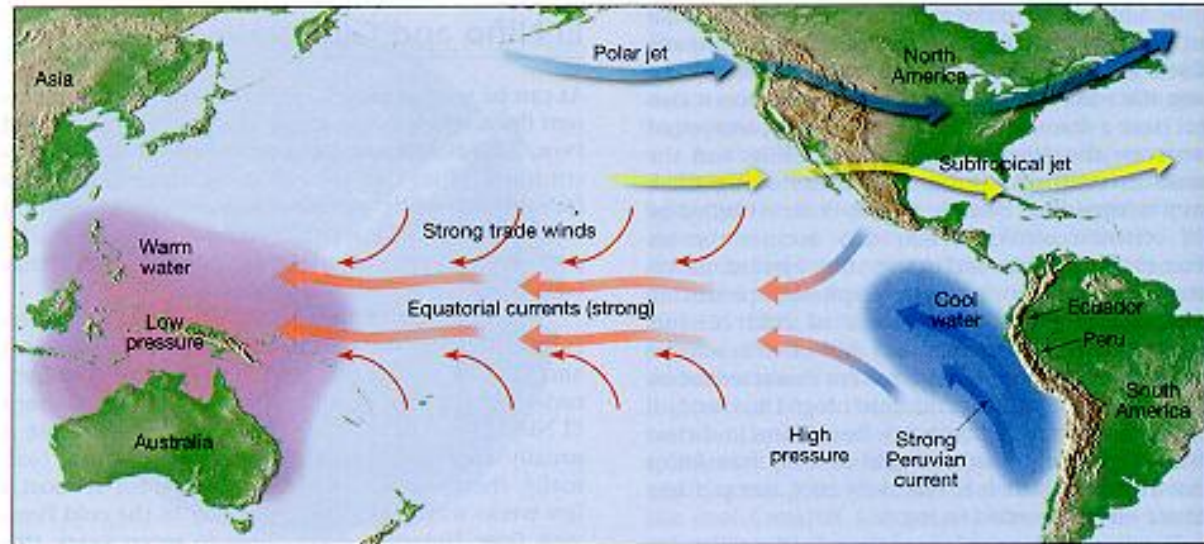


Figure 1.4 Rainfall and monsoon wind patterns in Southeast Asia (from Bellwood 1992).

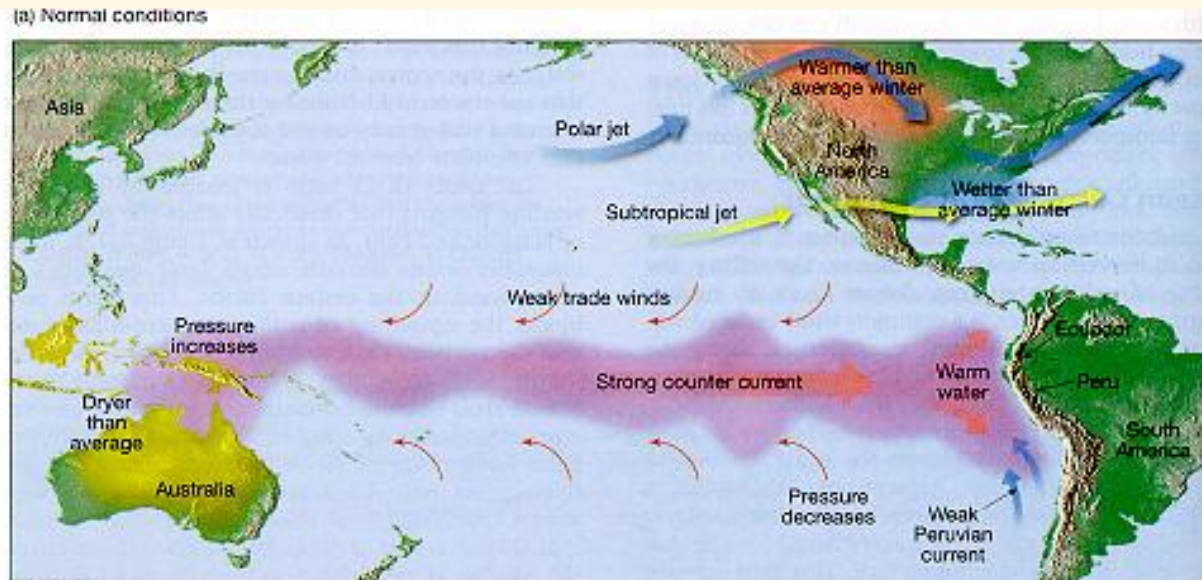
ENSO (El Niño Southern Oscillation)

Normal Condition



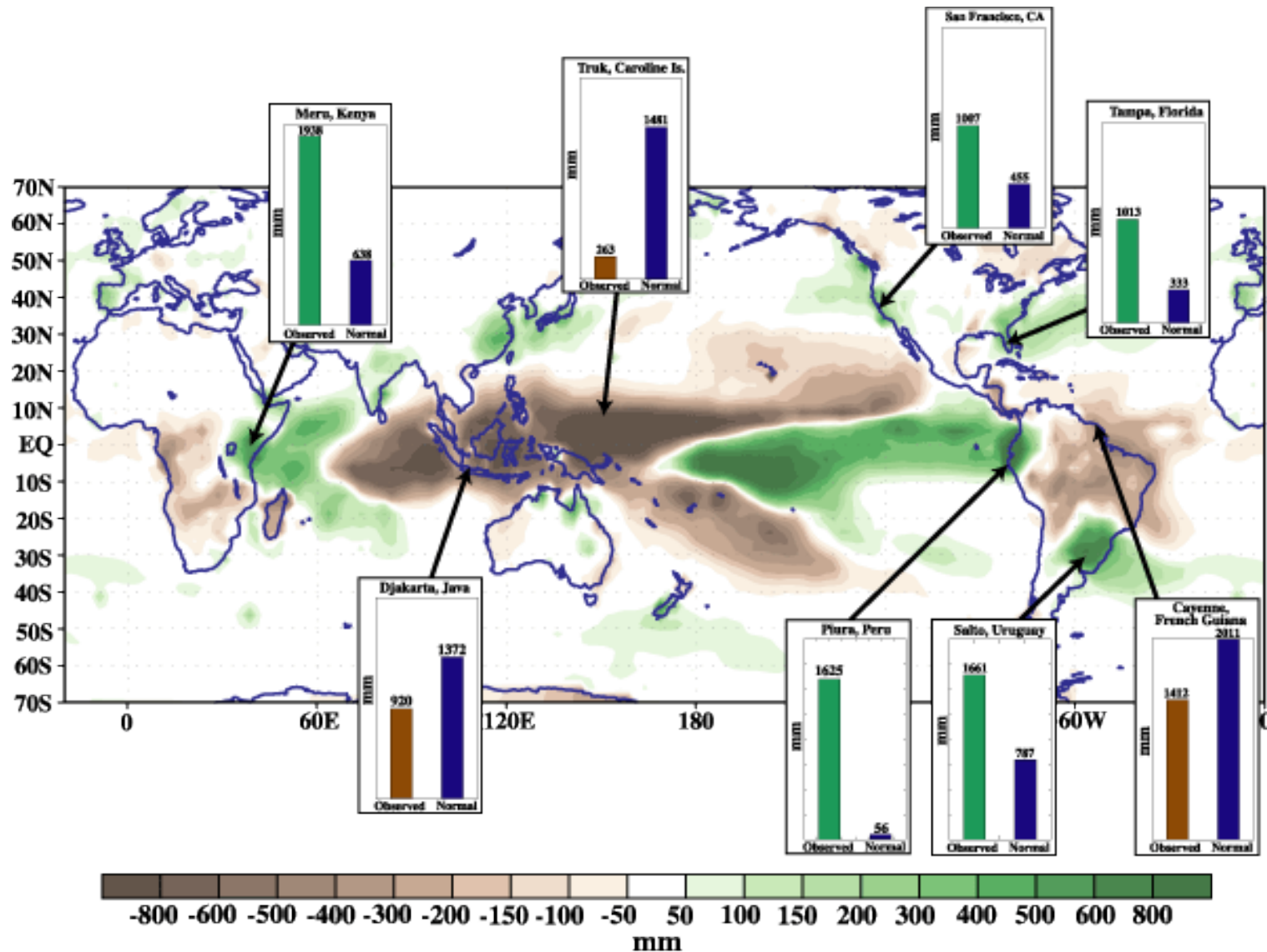
(a) Normal conditions

El Niño Stage



(b) El Niño

Typical El Niño rainfall anomalies

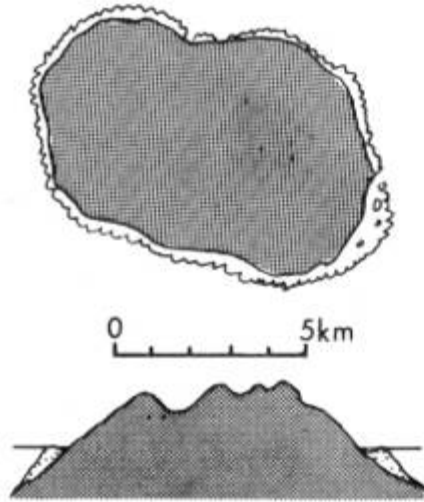




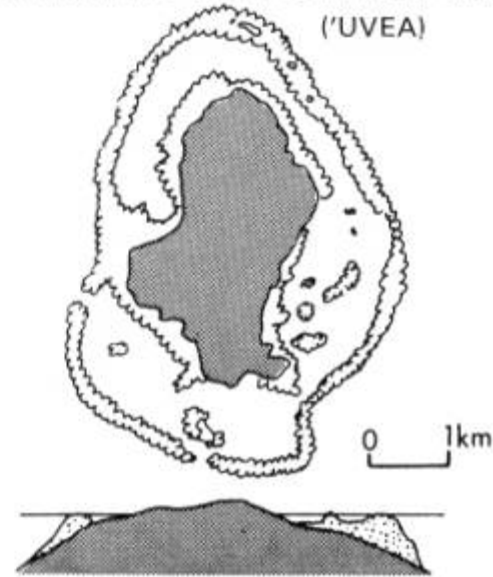
Island Geologies and Environments

Island Types

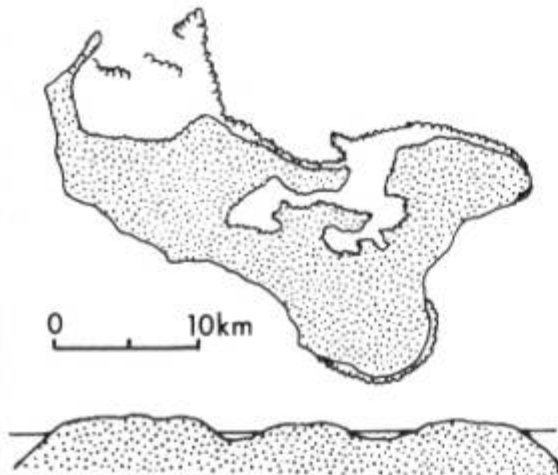
HIGH ISLAND WITH FRINGING REEF
(RAROTONGA)



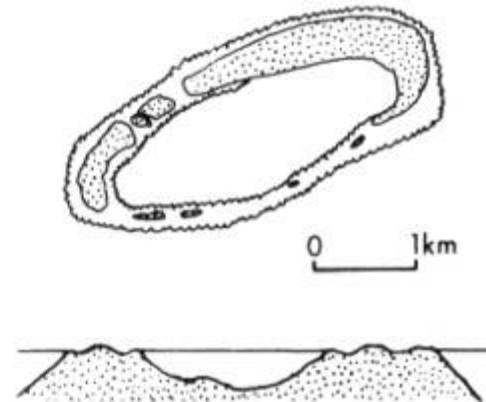
HIGH ISLAND WITH BARRIER REEF
('UVEA)



MAKATEA TYPE
(TONGATAPU)



ATOLL
(VAHITAHU)



examples of atolls

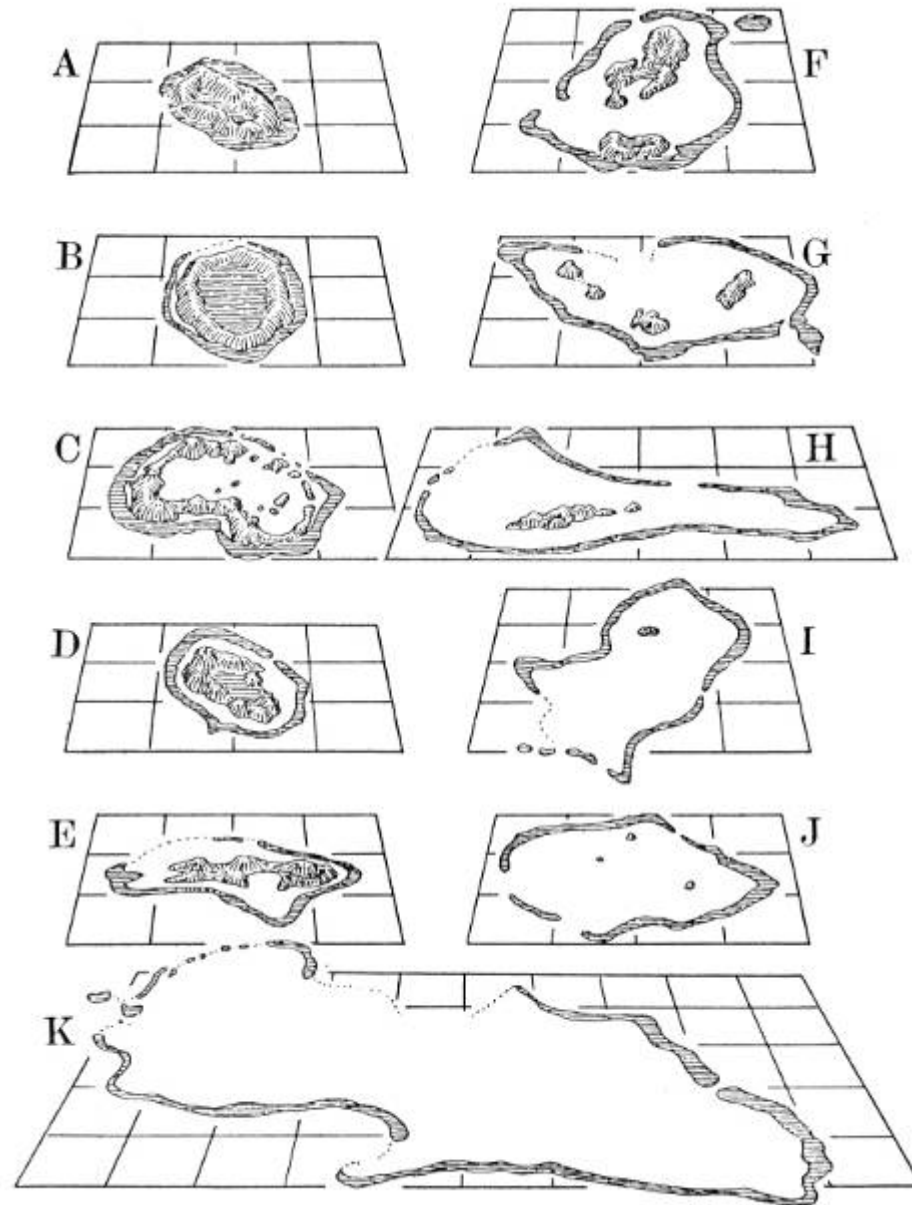


atoll, Tuamotu



Coral Atoll

atoll development



High islands and reef types

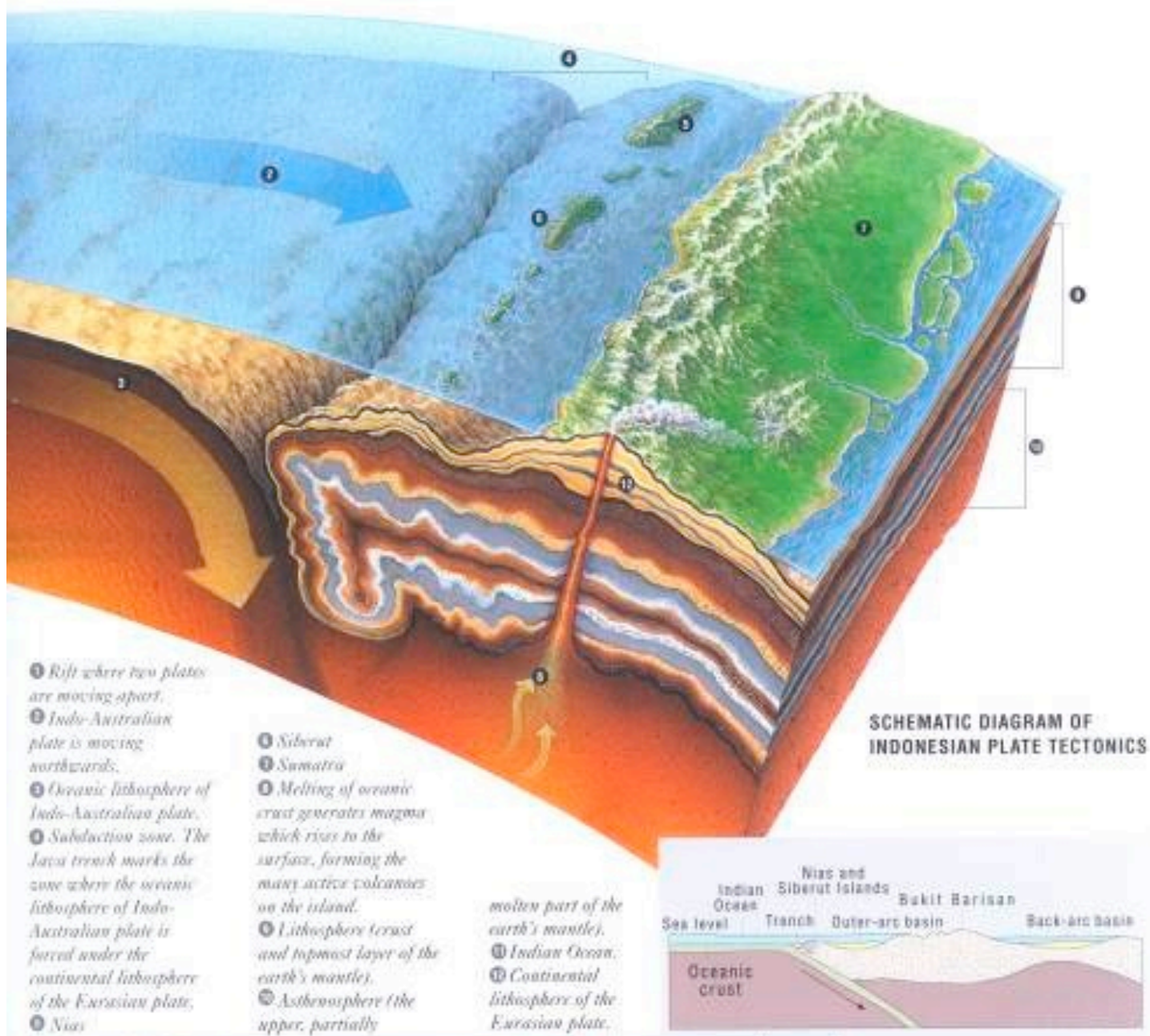


high island with barrier reef



high island with fringing reef

island arcs



Island arc (inner, with active volcano),
Banda group, Indonesia



Subsidence, showing drowned forest, Sumatra (post tsunami)



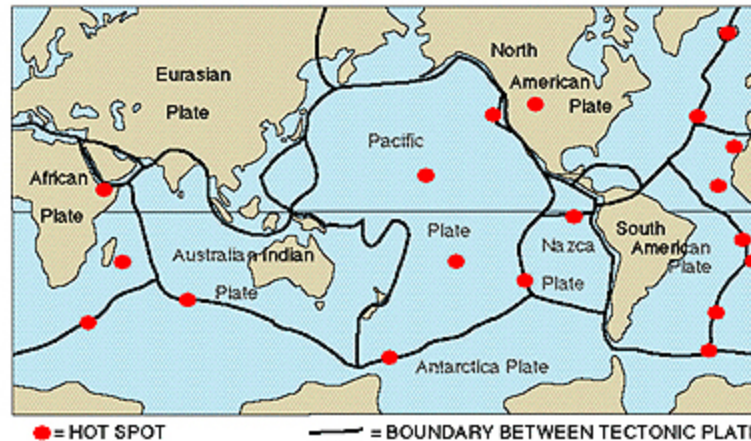
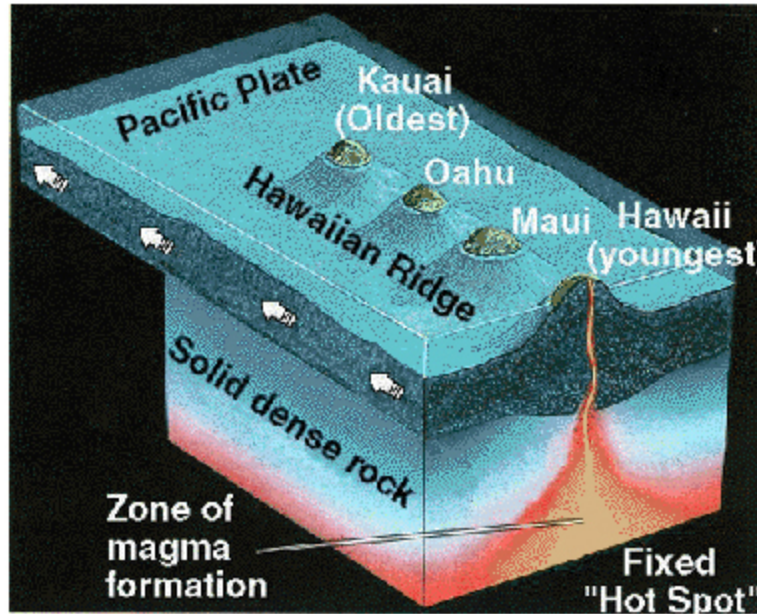
Uplifting showing wave cut terraces, Timor Leste



Makatea island



hot spots



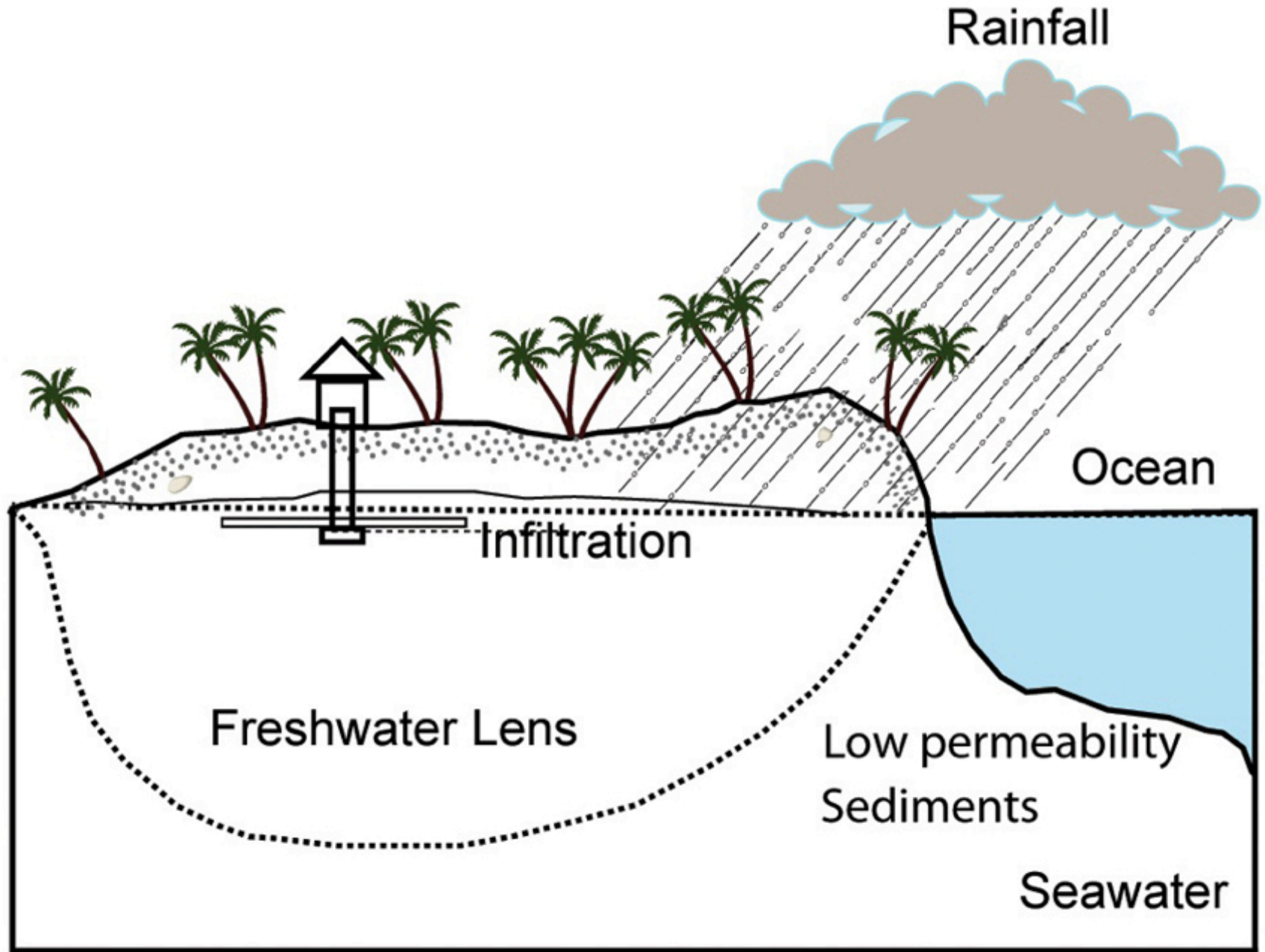
Hot spot islands, Hawaii



Continental island with glaciers West Papua Province, Indonesia



Island freshwater lens



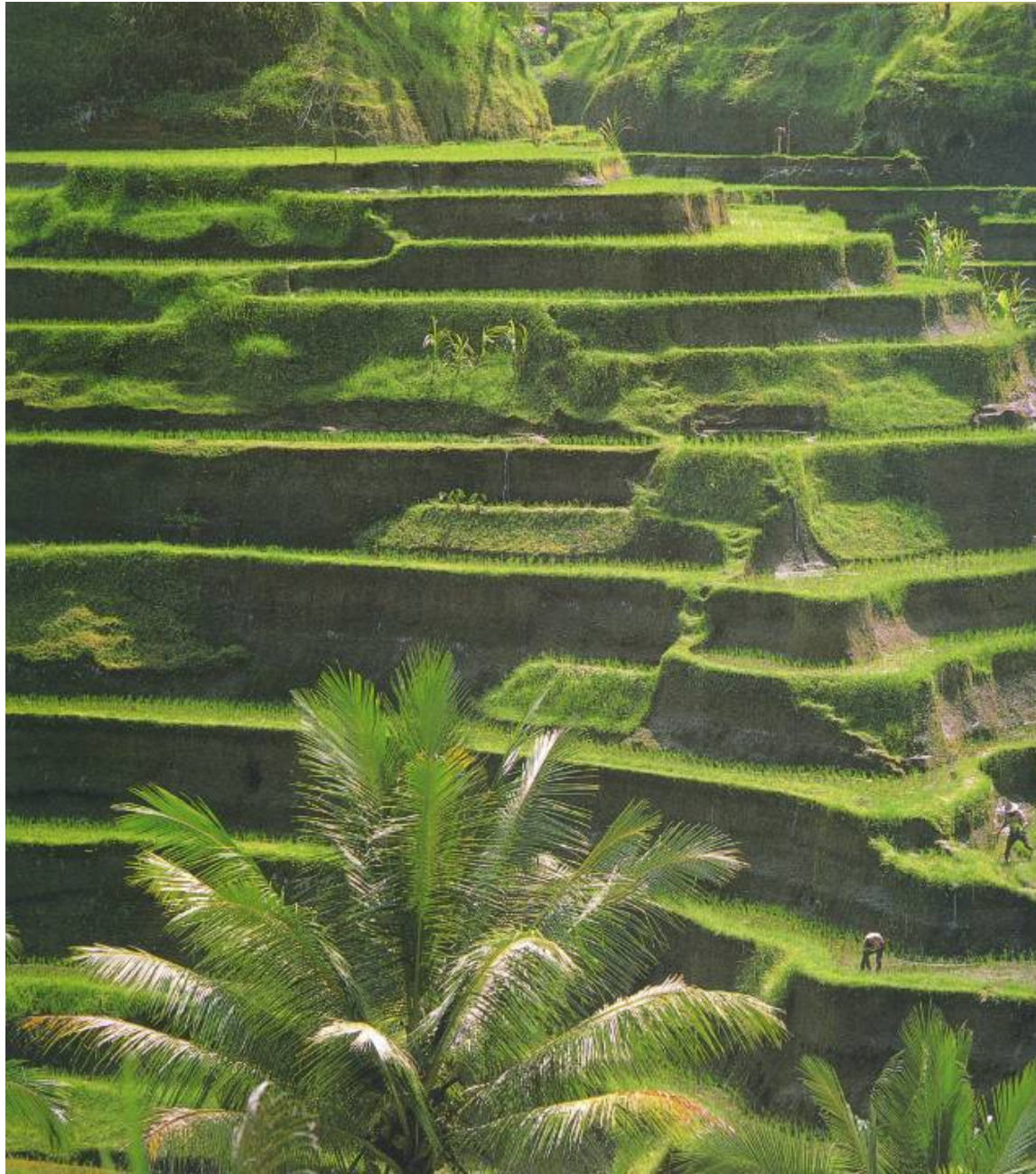
Anthropogenic landscape, Rapa Nui (Easter Island)



Anthropogenic landscape, Timor (end of dry season)



Anthropogenic landscape, Ifugao rice terraces, Philippines



Anthropogenic landscape, Hanelei taro fields, Kauai'i



