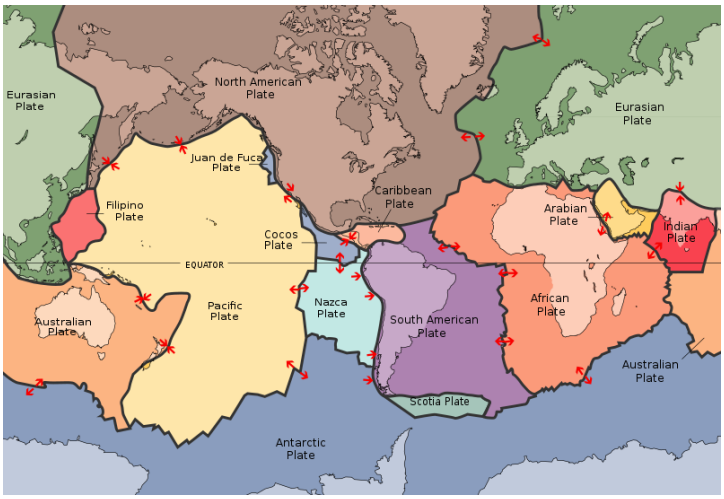
Why do Indonesia and the Philippines have such different wildlife?



Both Indonesia and the Philippines are characterised by high levels of biodiversity and endemicity, and together are two of the 17 megadiverse countries, as classified by Conservation International in 1998 (the term megadiverse country refers to any one of a group of nations that harbour the majority of Earth's species and high numbers of endemic species).

In addition, the geography of both countries is somewhat similar. They are archipelagos spread over a large area, and feature a varied climate and geography, which allows for a range of ecosystems to support such high biodiversity. Considering their close proximity to eachother, and the similarities in their climate, it would seem logical to assume the wildlife in each would also be similar. However, this is not the case.

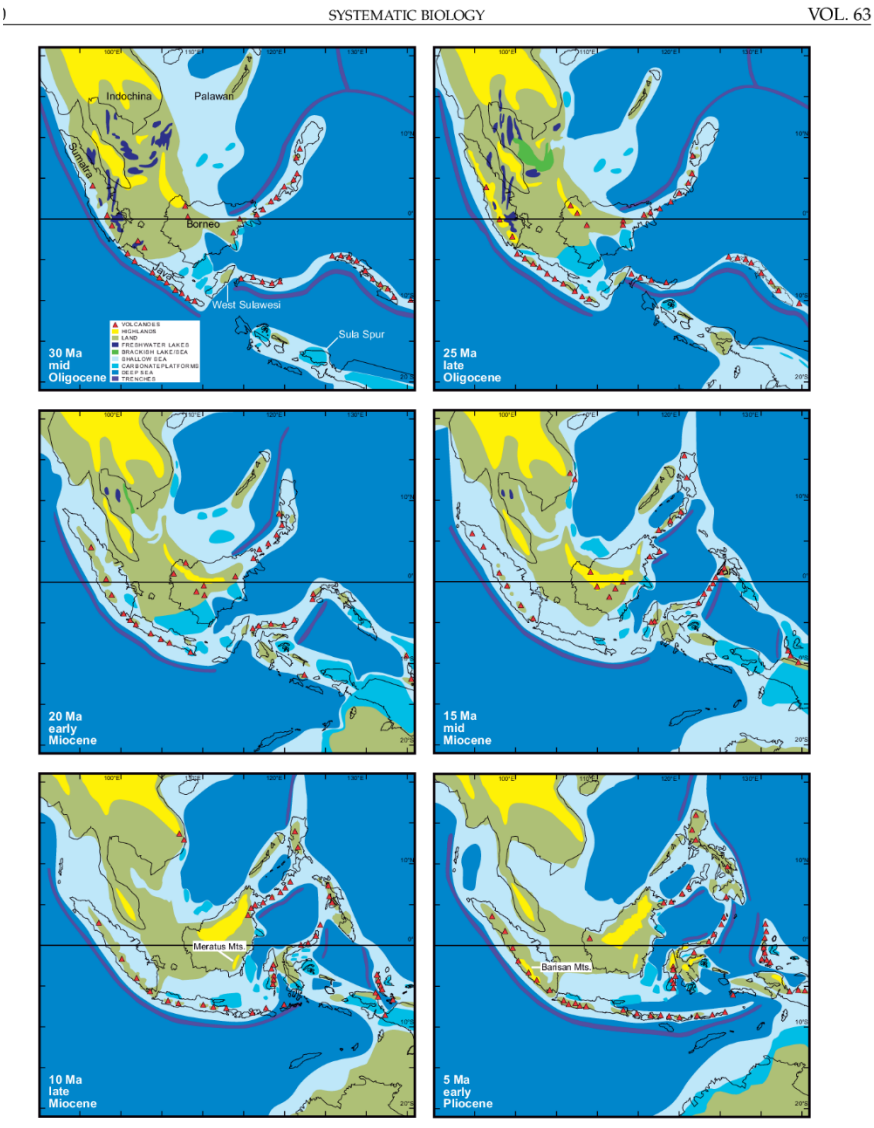
Indonesia is the largest archipelago in the world, and the most widely spread country in South East Asia. It has over 18000 islands, straddling the equator; the five main ones being Sumatra, Java, Kalimantan, Sulawesi, and Papua. Kalimantan is shared with Malaysia and Brunei, while Papua shares the island of New Guinea. These islands lie in what is known as the Ring of Fire, which is one of the most volcanically active and earthquake-prone areas on Earth. Within this huge number of islands there are rice lands as well as rainforests and savannah grasslands, and (many being volcanic). There are also magrove swamps and marshes, and even subtropical vegetation. In total, there are 13 types of forest. Furthermore, while the main climate is tropical rainforest, there is a great range of climates encompassed, including tropical monsoon, tropical savanna, oceanic, subtropical highland, tundra, and subpolar oceanic. There is also a great range of sea and coastal ecosystems, with Indonesia being one of the Coral Triangle countries (a term for the group of countries in a roughly triangular area in tropical waters where there are at least 500 species of reef-building coral in each ecoregion). As a result of all this, the habitats within the country can be very different to eachother!

Similarly, the Philippines is an extremely large archipelago, with approximately 8000 islands, twelve different forests, and five types of climate (tropical rainforest, tropical monsoon, tropical savanna, humid subtropical and oceanic). The country is the fifth largest island country, and is comprised of three isand groups: Luzon, the Visayas, and Mindanao. The Luzon island includes the largest island, also called Luzon, where the capital Manila is

situated. Because the overall group of islands is located on the western fringes of the Pacific Ring of Fire, the country experiences frequent seismic and volcanic activity.

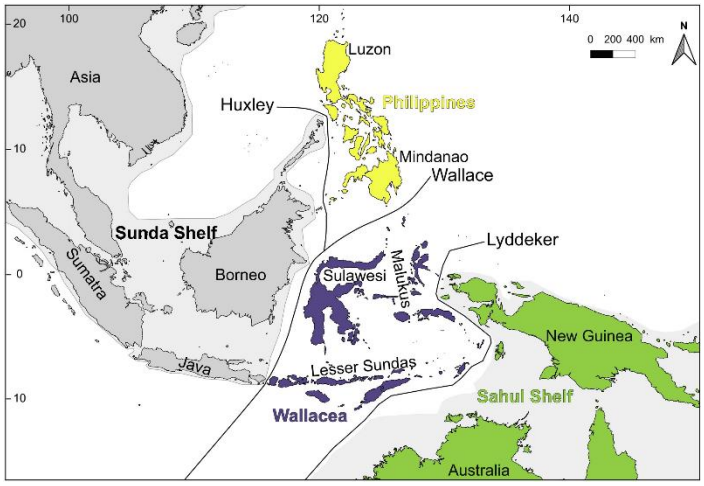
Again, in a similar way to Indonesia, the archipelago also houses a number of environments, from mountain ranges and highlands to rice fields, flat plains, coastlines, and tropical rainforests, with the latter being one of the characteristics of high biodiversity. It is also a Coral Triangle Country, and it also features high endemicity. In fact, the Philippines, despite it's smaller size, actually has a higher endemicity than Indonesia, with 50% of the species within the country are endemic, compared to Indonesia's 39%. Something that is very different about the Philippines to Indonesia, however, is it's history.

About 60 million years ago, the Philippine archipelago was formed by volcanic eruptions from under the sea and the buckling of the earth's crust when two tectonic plates collided. When the world's largest and much heavier Pacific Plate moved under the smaller Philippine Plate, the Philippine Plate buckled under the tectonic pressure. Northern Luzon sat on the western edge of the Philippine Plate, while the remaining islands rested on the eastern edge of the Asiatic Plate. The southward movement of the Asian landmass formed the shallow China Sea; the crests of the folds produced in the submerged ridge created the elongated mountain ranges of the Northern Philippine islands. Fissures formed and continuous volcanic activities threw enormous debris across the landscape, creating the islands that make up the Philippine archipelago. The shape of the archipelago we see today is the result of these islands being subject to typhoons, further eruptions, and other climatic occurences. Over time, Luzon was torn



away from Taiwan, the Visayas from Luzon, Mindanao from the Visayas, Borneo from Mindanao and the Sulu Archipelago from Mindanao and Borneo.

Because much of the Philippines were never connected to the Asian mainland, it has very distinct fauna. The Northern connection, from Taiwan, existed earlier, during the Mesozoic era (250 to 65 million years ago) - and this is why flowering, and some non-flowering, plants, as well as some large mammals came to the Philippines from Asia. These species did not make it to the Visayas or Mindano, which were already separated by water from Luzon. When the land connection to Taiwan vanished, only three land bridges connected the Philippines to other countries: one from Borneo to Palawan, one from Sulawesi to Mindanao, and one from Borneo to Mindanao. These bridges allowed some Indonesian, Malaysian, and New Guinea animals and plants to venture into the Philippines. Eventually all these land bridges were lost (the last disappearared around 25000 years ago). As a result, the Philippines features a high number of unique animals (due to it's isolation), as well as a scattering of fauna and flora of East Asian/Taiwanese (in the North) and Wallacean/Australasian (in the South) origin. Notably much of the larger Asian mammals, including elephants, rhinos, and orangutan became extinct because they were restricted to very small islands, and had to compete with humans (for example, the Philippine rhino, which was essentially a larger version of the Sumatran rhino).



On the other hand, Indonesia was formed much earlier than the Philippines, in relation to movements of the two supercontinents Gondwana and Pangaea, hungreds of millions of years ago. When the southern supercontinent Gondwana began to break up 140 million years ago, the Australian-New Guinea continent (known as Sahul) moved towards the equator, and animals from New Guinea and Australia travelled between eachother. The Laurasian landmass broke up around 200 million years ago, forming Laurentia (North America) and Eurasia. Due to fluctuating sea levels, mainland Eurasia was not separated completely from the western part of the Indonesian archipelago, allowing animals from the Eurasian mainland passage to the archipelago, and new species evolved. Volcanic activity resulted in the exact formation of Indonesia - with the islands in the Western Indonesian archipelago and Sumatra, Java, and Borneo remaining connected with Asia by the ice age, when lower sea levels enabled animals from the Asian mainland to migrate. These lands are collectively known as the biogeographic region Sundaland (while the series of islands between Sunda and Sahul are known as Wallacea). Sundaland/the

Sundashelf Islands can be separated from the other islands/Wallacea by the Wallace line, which is a notional line following deep water straits that divideds the Indonesian archipelago into the two regions, one with Asian zoogeographical features and one with Australasian-influenced zoogeographical features.

In summary, it is these key differences in the geological movements that formed the Philippines and Indonesia archipelagos, and the resulting ability (or in some cases, lack of ability) for species from Asia and Australasia to reach each country's different islands, that has lead to their contrasts in wildlife. Within Indonesia, we see tigers, elephants, leopards and orangutan - animals of Asiatic origin - in Sundaland, as well as komodo dragons, crocodiles, and pig like species in Wallacea. In the Philippines there are water buffalo, tamaraw, crocodiles, deer, and tarsiers, with many of the endemic species being limited to one particular area of the archipelago (they therefore have to compete with humans more than species in other countries - this is why there are so many threatened species within the Philippines)! Regardless of the exact origins of their fauna, what is clear is that both Indonesia and Philippines are countries rich in ecological diversity. They each house a distinctive and varied set of species in a complex range of environments - and need to be celebrated for their uniqueness.

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