



Homo luzonensis a new human species contemporaneous with *Homo sapiens* discovered in the Philippines

An international multidisciplinary team, co-led by a MNHN senior lecturer of the H & E department, Florent Détroit, discovered a new hominin species, *Homo luzonensis*, during the excavation of Callao Cave, situated on Luzon island, Northern Philippines. Published in the journal *Nature*, the study of the fossils dated to 50 to 67 000 years highlights a singular mosaic of morphological characteristics that differentiates *Homo luzonensis* from other species of the genus *Homo* and underlines the major role played by Island Southeast Asia in the evolutionary history of hominines.

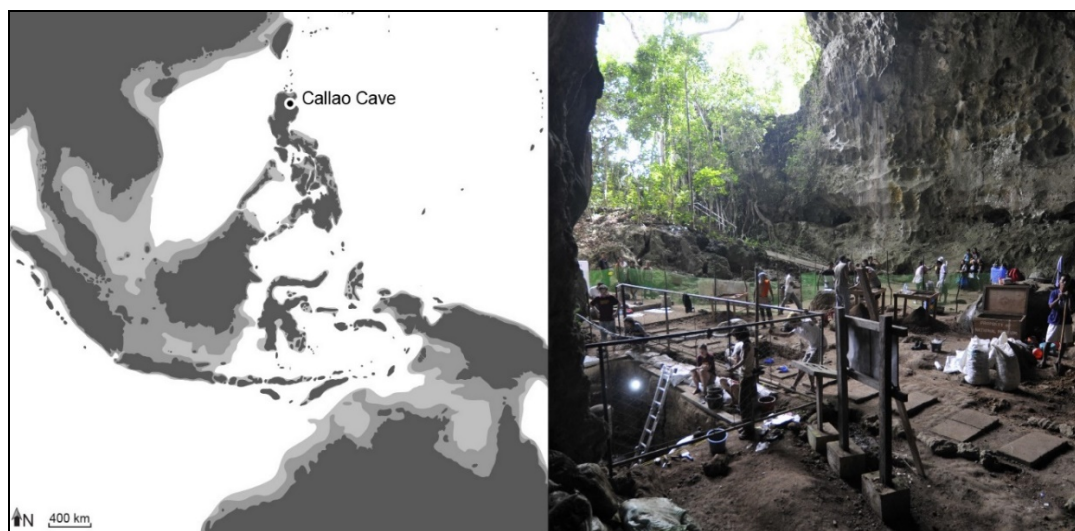


Figure 1. Left: Location of Callao Cave in the north of Luzon Island (Philippines) which has never been accessible by foot from the Asian continent during the Quaternary epoch (see the extension of emerged lands at lower sea levels of 50 m in medium gray and 120 m in light gray); Right: View of the excavations of Callao Cave in 2011.

The new species, *Homo luzonensis*, is described from an assemblage of fossil bones and teeth that belonged to at least 3 different individuals discovered during the excavations carried out in Callao Cave in 2007, 2011 and 2015. Two of these fossils have been directly dated to 50,000 and 67,000 years, respectively by uranium series analysis. They are the earliest known human remains in the Philippines, preceding the first *Homo sapiens* remains dated to 30 to 40,000 years ago discovered on Palawan island, southwest of the archipelago.

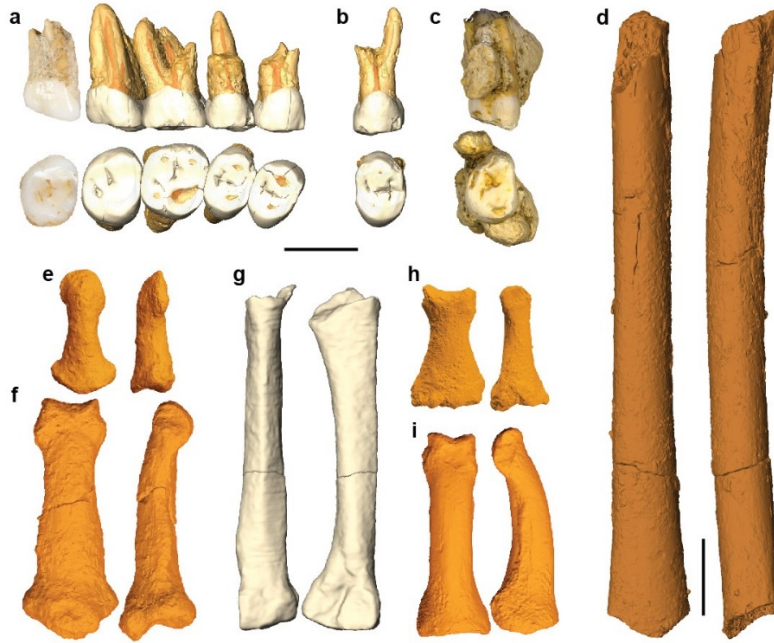


Figure 2. Fossils discovered in Callao Cave and attributed to the new species *Homo luzonensis*. a-c: maxillary teeth (a: premolars and molars CCH6; b: premolar CCH8; c: molar CCH9); d: juvenile femur CCH7 (incomplete); e-f: hand bones (e: distal phalanx CCH5; f: intermediate phalanx CCH2); g-i: foot bones (g: metatarsal CCH1; h: intermediate phalanx CCH3; i: proximal phalanx CCH4). Scale bars: 1 cm (a-i) and 2 cm (d).

Comparative analyses undertaken on the fossils, using 3D imaging methods and geometric morphometrics, show that the species *Homo luzonensis* has very primitive elements or characters, resembling *Australopithecus*, and others which are very modern, close to our own species *Homo sapiens*.

Two examples are particularly demonstrative:

- The teeth: The premolars and molars shown in Figure 2-a belonged to the same individual. Premolars have 2 to 3 roots, whereas in *Homo sapiens* there is most often one root, sometimes two. By this feature and by the morphology of the enamel and dentine, the premolars of *Homo luzonensis* show similarities with *Australopithecus* and ancient species of the genus *Homo*, such as *Homo habilis* and *Homo erectus*. In contrast, the molars are very small and have a very simple morphology, resembling the molars of *Homo sapiens*. An individual with these characteristics combined can not be classified in any of the species known today.
- The bones from the feet (Figure 2- g,h and i): we observe on the proximal phalanx a very marked curvature and very developed insertions for the muscles involved in the flexion of the foot. These characteristics do not exist in *Homo sapiens*. In contrast, this phalanx strongly resembles those of *Australopithecus*, known only in Africa and at much older periods (about 2 to 3 million years ago).

This singular combination of characters clearly distinguishes it from other representatives of the genus *Homo*, especially the contemporary species known in Southeast Asia, such as *Homo sapiens* and *Homo floresiensis*.

Luzon is a large island which has never been accessible via a land bridge throughout the Quaternary. Its fauna and flora are known for a long time for their high rate of endemism, which is linked to a decrease of their genetic diversity and visible in the form of species that often differ greatly from their sister species that have remained on the continent. The oldest traces indicating the presence of hominins on the island are dated to about 700,000 years ago (see the study published in 2018 "Earliest known activity in the Philippines by 709 thousand years ago", *Nature*, 2018).

Homo luzonensis, whose fossil remains are some 600,000 years younger (they are dated from 50,000 to 67,000 years ago), probably represents a species of the genus *Homo*, which evolved under the effects of island endemism, paralleling the evolutionary history of *Homo floresiensis* on the island of Flores in Indonesia. Insular endemism could be one of the possible explanations for the "reappearance" of primitive features in *Homo luzonensis*.

Its origin and the modalities of its arrival on Luzon island remain largely mysterious for the moment, but this discovery underlines the diversity, the richness and the complexity of the past migrations and of the evolutionary history of the hominines in island Southeast Asia.

Reference

A new species of *Homo* from the Late Pleistocene of the Philippines, *Nature*, 2019

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