

# EXTICTION OF QUATERNARY MAMMALIAN HABITATS OF MEGAFUNA IN SABARAGAMU BASIN - SRI LANKA

<sup>1</sup>Aravinda Ravibhanu Sumanarathna <sup>2</sup>Jinadasa Katupotha <sup>3</sup>Kamal Abeywardana

<sup>1,3</sup> South Asian Astrobiology & Palaeobiology Research Unit of Eco Astronomy Sri Lanka.

<sup>2</sup> Department of Geography: University of Jayawardenepura

<sup>1</sup> Faculty of Enviroment & Natural Science University of Southampton –United Kingdom

*Email: Ara22ravibhanu@gmail.com*

## ABSTRACT

The Quaternary includes two geologic epochs: the Pleistocene and the Holocene. Both epochs divided to faunal stages and human cultural phases based on climate and sea level cycles for the past three million years. Quaternary ice age begins roughly 2.58 Ma with cool and dry climate conditions. Australopithecines and many of the extinct genera of mammalian mega fauna appeared in this time. Thus, the Quaternary period show the extinctions of numerous predominantly larger, especially mammalian mega faunal species, many of them lived during the transition from the Pleistocene to the Holocene epoch. The debate on the demise of the mammalian megafauna is often characterized by two highly polarized points of view: (1) climate-induced extinction; and (2) human-induced extinction. In Pleistocene period most parts of the Northern Hemisphere were covered with glaciers creating a cold climate. Due to this glacial formation the main sea level was much lower than today. The low sea level facilitated the connection of Sri Lanka with the Indian mainland with a land bridge. Therefore a number of mega and micro fauna was able to cross to Sri Lanka from India. The last land bridge was emerged around 7500 yr BP. In Pleistocene era Sri Lanka experienced heavy rainfall and covered with rain forest. These heavy showers in the Sabaragamu basin provide habitats for a number of Marsh loving mammals and other animals. However at the end of Pleistocene the climate changes resulted in the extinction of number of a animals. Pleistocene fauna in Sri Lanka is known as Rathnapura Fauna. These fossils were found in alluvial deposits of Sabaragamu basins.

**Key Words:** *Quaternary mammalian, Sabaragamu Basin, Ratnapura fauna, Extinction, Gem gravels.*

## **INTRODUCTION**

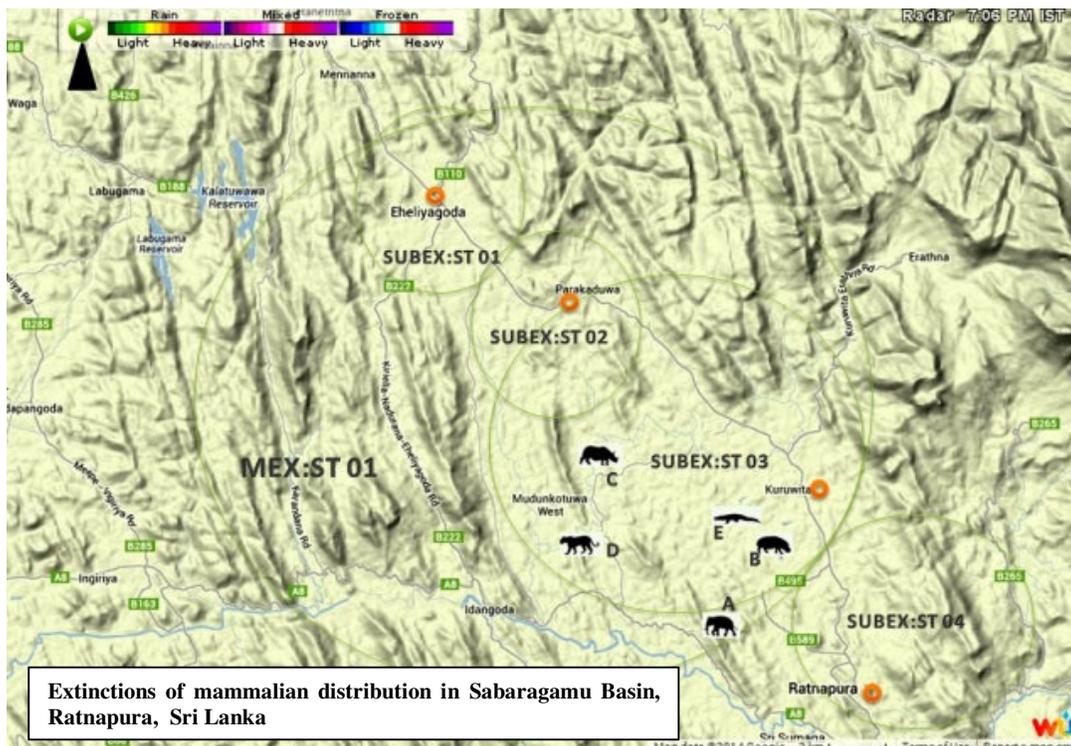
The Pleistocene is generally recognized as a time of gigantism in terrestrial mammals. The causes for such gigantism are not completely understood, but they most likely include a response to colder conditions and an improved ability to resist predators and reach food higher on shrubs or buried beneath snow (Britanica.com 2014). Ninety percent of the animals represented by Quaternary fossils were recognized by Charles Lyell (1820) as being similar to modern forms including many genera and even species of shellfish, insects, marine microfossils, and terrestrial mammalian mega fauna living today are similar or identical to their Pleistocene ancestors (Britania.com 2014). Many Pleistocene fossils demonstrate spectacular differences from of 1833 to up to date by palaeontologists, geologist, sedimentologists, the International Union for Quaternary Research (INQUA), International Geological Correlation Programmes (IGCPs), International Union for Geological Sciences (IUGS) and individuals from different disciplines and geographical locations have been discussed Chalrs Lyells findings (1830), and found extinct and new marine and terrestrial fauna emphasizing the Quaternary period. Such studies are very useful for further investigation of extinction of the mammalian megafauna from different regions of the world. The Indian subcontinent represents a rich source of diverse paleoanthropological data in the form of pollen assemblages, various isotopic records, vertebrate and invertebrate fossil assemblages, and prehistoric stone tools in a range of palaeoecological contexts (Metzke et al 2010). Most of the Quaternary fossil evidence, including hominin specimens comes from the fluvial sediments of the Narmada and other similar rivers (Chauhan, 2008). During the Quaternary climate and sea level changes, which were followed the glacial and interglacial stages, allowed to fauna migrating or lodging in continents as well as nearing islands (Katupotha, 2013). Therefore a number of mega and micro fauna was able to cross to Sri Lanka from India. The last land bridge was emerged around 7500 yr BP (Katupotha 1995). The diverse paleoanthropological records, vertebrate and invertebrate fossil assemblages, and prehistoric stone tools in a range of palaeoecological contexts found in Sri Lanka from Gem pits and coastal deposits proved such (Deranigala 1958; S.U. Deraniyaga 1992).

## **METHOLOGY & MATERIALS**

Fossil identification was carried out according to the special characters that found in those fossils and anatomical comparisons also were done (EASL research center, Kuruwita 2015).

Relative dating was used to place those fossils in correct positions of the geological time scale (i.e., the age of an object in comparison to another). Biostratigraphy was used to place them in a correct order but we do not yield any numerical estimates, which related to C dating or thermo luminescence (TL). As primary sources early research and publications were studied. For fossil characterization and studying of special features digital vernier caliper (150mm: 6”) , and Scale bars were used. For locating those fossil bearing places Garmin 30 GPS with Base Camp GIS was also used.

Pleistocene fossils from Sabaragamu Basin (Fig. 1) in Ratnapura district of Sri Lanka discovered in association with “Ratnapura (alluvial deposits) gem pits”. Fossils were described as the “Ratnapura Fauna” by Deraniyagala (1958), and were trying to identification, classification, taxonomy and describe their palaeoecology, palaeoclimatology and palaeoenvironment. Table 1 shows the list of extinct mammalian megafauna in Sri Lanka during the Quaternary period.



**Fig 01 : Geological view of Sabaragamu Basin | SUBEX:ST01-Sub excavation point Eheliyagoda, SUBEX:ST02- Sub excavation point Parakaduwa, SUBEX:ST03-Sub excavation point Kuruvita, SUBEX:ST04-Sub excavation point Rathnapura, Most abundance animal fossils of main excavation site(MEX:ST01)-A:Elephants spp., B: Hippopotamus, C: *Rhinoceros* spp., D:Tiger or leo, E: *Crocodiles* spp. © *Eco Astronomy Data Base*, 2015**

**Table 1. Extinctions of mammalian megafauna species during the transition from the Pleistocene to the Holocene epoch in Sri Lanka**

Familia	Sub familia	Genus	Species	Subspecies	English Name & Locality	Other References
(1) <u>Felidae</u>	<u>Pantherinae</u>	<u>Panthera</u>	<u>Panthera leo</u> (extinct)	<u>Panthera leo sinhaleyus</u> (Deraniyagala, 1939) 39,000 yr	Sri Lanka lion	<i>Kelum et al 2005</i>
(2) <u>Felidae</u>	<u>Pantherinae</u>	<u>Panthera</u>	<u>Panthera tigris</u> (extinct)	16,500 yr	Tiger	<i>Panthera tigris sudanensis</i> Deraniyagala 1951 ?
(3) <u>Felidae</u>		<u>Panthera</u>	<u>Panthera pardus</u>	<u>Panthera pardus kotiya</u>	<i>Tiger ?</i>	
<u>Canidae</u>	<u>Caninae</u>	<u>Canis</u>	<u>C. lupus</u>		?	
<u>Bovidae</u>	<u>Bovinae</u>	<u>Boselaphus</u>	<u>Boselaphus tragocamelus</u> (extinct)		four-horned antelope	
<u>Bovidae</u>	<u>Antilopinae</u>	<u>Antilope</u>	<u>Antilope cervicapra</u> (extinct) ?		?	
<u>Bovidae</u>	<u>Bovinae</u>	<u>Bos</u>	<u>B. gaurus</u> (extinct)	<u>Bibos sinhaleyus</u> , 1962	Sri Lankan Gaur	
<u>Canidae</u>	<u>Caninae</u>	<u>Cuon</u>	<u>Cuon alpinus</u>		Wild dog ?	
<u>Hippopotamidae</u>		<u>Hippopotamus Linnaeus</u>	<u>H. amphibious</u> (extinct)	<u>Hexaprotodon sinhaleyus</u> , 1937		
			(extinct)	<u>Rhinoceros sinhaleyus</u> , 1936		
			(extinct)	<u>Rhinoceros kagavena</u> , 1956		
			(extinct)	<u>Elephas maximus sinhaleyus</u>		<u>Sri Lankan Elephant</u>
<u>Bovidae</u>	<u>Bibos</u>	<u>Bovinae</u>	<u>B. sinhaleyus</u>			

*Source: Action plan for conservation & sustainable use of palaeobiodiversity in Sri Lanka, 2016: Biodiversity Secretariat, Ministry of Environment & Renewable Energy and personal Observations.*

### ***Panthera leo sinhaleyus* (extinct)**

*Panthera leo* (the lion) fossilis laid upon the gem field at a depth of 6.5m below the surface from a gem pit about four miles away at Pahala Vela, Galadande Mandiya, Gonapitiya, Kuruwita near the Kuru Ganga. The holotype is a third lower left carnassial in the Deraniyagala collection at the British Museum (Deraniyagala, 1958). This race is restricted to Sri Lanka; originally the lion appears to have inhabited Sri Lanka and India and was possibly replaced by the so called Bengal tiger that invaded India from the Northeast. The similarity

between the African name is “Simba” = Lion, and the Indian equivalent Simha suggests that one is derived from the other. The lack of lion fossils in Africa suggests that the African is derived from the Indian *Panthera leo sinhaleyus* also known as the Sri Lanka Lion, was a prehistoric subspecies of lion, endemic to Sri Lanka. It appears to have become extinct prior to the arrival of culturally modern humans, c. 39,000 years ago. This lion is only known from two teeth, found in alluvial deposits at Kuruwita. Deraniyagala cited fossils of three lion teeth found in the island; one in 1936, another in 1947 and the third in 1961. Manamendra-Arachchi et al (2005) describe that Deraniyagala did not explain explicitly how he diagnosed the holotype of this subspecies as belonging to a lion, though he justified its allocation to a distinct subspecies of lion by its being "narrower and more elongate" than those of recent lions in the British Natural History Museum collection.



**Fig 02: Recent fossils that have found in Sabaragamu Basin 1990-2013**

1. *Panthera tigris* or *Panthera leo sinhaleyus* .Canine tooth in right lower mandible. Location – Galukagama MahaEla, Puwakattaovita, Kuruwita 2008 : by Kamal & Aravinda
2. *Rinoceros sinhaleyus* –proximal portion of Scapula. Location-Kuruwita P 2001: by Kamal & Aravinda
3. *Bibos sinhaleyus* –BovinVertibra .Location – Ovita Kumbura ,Khenagaa West Kuruwita[20 feet below] 2005: by Kamal & Aravinda
4. *Crocodylu* ssp.Location – Khengama, OvitaKumbura, Kuruwita, 2013 March: by Kamal & Aravinda
5. *Rusa unicolor* – Right mandible , outer or ducal expects with 2 pre molars and molars. Location- Edandawela, Kuruwita ,2007: by Dr.Kamal & Aravinda
6. *Elephas maximus sinhaleyus*-premolars, Location – Mawee Kubura ,Kuruwita -1993: by Kamal & Aravinda. © *Eco Astronomy Data Base*

The lion has been one of the most widespread mammals, having enjoyed a Pleistocene range that included Africa, Eurasia, North America and tropical South America, while the fossil record confirms that the species range in the Indian subcontinent did extend south to the 21st parallel and east to 87° E (Pilgrim 1931; Dutta 1976), approximately a line joining Gujarat to Bengal, but there is no evidence of the existence of the lion in Asia east of Bengal or anywhere in peninsular India and Sri Lanka, except for *P. leo sinhaleyus*. *Panthera leo fossilis*, also known as the Early Middle Pleistocene European cave lion, is an extinct feline of the Pleistocene epoch.

### ***Panthera tigris*** (extinct)

*Panthera tigris* is a member of the Felidae family and the largest of the four "big cats" in the genus *Panthera*. The *Panthera tigris tigris* (Bengal tiger) is a tiger subspecies native to India, Bangladesh, Nepal and Bhutan. The pattern of genetic variation in the Bengal tiger corresponds to the premise that tigers arrived in India approximately 12,000 y ago. Kitchener and Dugmore (2000) consider that the changing biogeographical range of the *Panthera tigris* through the last glacial-interglacial cycle, based on habitat associations of modern tiger specimen records, and environmental reconstructions from the LGM. These cycles indicate that the numerous glacial cycles that span the evolutionary history of the tigers since its appearance in the fossil record about 2 Ma ago and the oldest tiger fossils (around 2 Ma old) are from northern China and Java. The key issue is to determine the extent to which ancestral populations of the tiger were geographically isolated. However, Pleistocene glacial and interglacial fluctuations and other geological events probably caused repeated geographic restrictions and expansions of tigers. Hemmer (1987), Kitchener and Dugmore (2000) estimated the most recent common ancestor for tiger mtDNA haplotypes was 72,000–108,000 years ago, with a lower and upper bound of 39,000 years and 157,000 years, respectively. Recent history of tigers in the Indian subcontinent is consistent with the lack of tiger fossils from India prior to the late Pleistocene and the absence of tigers from Sri Lanka, which was separated from the subcontinent by rising sea levels in the early Holocene. However, a recent study of two independent fossil finds from Sri Lanka, one dated to approximately 16,500 years ago, tentatively classifies them as being a tiger (Manamendra-Arachchi 2005).

However, the discovery of the Ratnapura tiger in alluvium, together with hippopotamus and rhinoceros fossils, demonstrates that tigers did indeed occur in the island. Nine fossils and sub fossils were identified that belongs to Tiger. Five of the fossils dated among those and identified aged 14,000 – 20,000 old. One fossil identified that is belongs to Lion. Tiger was living 17,000 years before (Manamendra-Arachchi 2009). The Holocene range of the tiger extends to the southernmost tip of peninsular India and to all of tropical continental Asia. The apparent absence of evidence of tigers in Sri Lanka and Pleistocene peninsular India has led to the conclusion that tigers arrived in south India “too late to get into Ceylon” (Pocock 1930) as a result of the India-Sri Lanka land bridge having been submerged since the Late Pleistocene. On the basis of the few known Indian tiger fossils dating to the Holocene and the recent literature too, dates of the arrival of tigers to the Indian peninsula were occurred in the last glacial maximum, ca. 12,000 yr BP.

*Panthera tigris* probably differentiated in the early Pleistocene (1.806–2.588 Ma ago) in northcentral and northeastern China. The earliest forms averaged smaller than those of later Pleistocene times. It thus seems that the species has reached its maximum size in the living subspecies *P. t. altaica*. The early Pleistocene species *Panthera palaeosinensis*, from northern China, appears to represent an early tiger or a form ancestral to the tiger (Mazak 1981).

Researches on fossil remains have been conducted by many scientists, and Mazak (1981) summarizes them. Accordingly fossil remains, definitely identified as *Panthera tigris*, are of lower to upper Pleistocene age and originate from the Altai caves in central Asia, eastern and northern China, including Choukoutien *localities*, Japan, Jana River in northern Siberia, the Ljachov Island situated off the northern coast of Siberia, and from Sumatra and Java. In addition, several sub-Recent tiger remains were found in Caucasus region, India, and Borneo. It is not clear whether the material from Borneo represents a member of the native late Pleistocene fauna or a later introduction by humans (there is no reliable evidence of tigers on Borneo within historic times).

### ***Elephas maximus sinhaleyus* (extinct)**

The Asian elephant (*Elephas maximus*) is one of the most seriously endangered species of large mammals in the world. Given its enormous size and body mass, it is also one of the few species of terrestrial mega herbivores still exist. Its present geographical distribution extends

from the Indian subcontinent in the west to Indo-China in the east across 13 countries including islands such as Sri Lanka, Sumatra and Borneo. The entire population in the wild is estimated to be between 35,000 and 55,000. Even optimistic figures indicate that there are only about one tenth as many Asian as African elephants (Hendavitharana et al 1994).

Deraniyagala found one Fossil and explained the extinct Sri Lankan elephant as subspecies of *Elephas maximus sinhaleyus* (Deraniyagala, 1958). Deraniyagala explained the tusks usually present, molars smaller and mandibular spout wider than in form typical. Also he explains that three recently extinct subspecies of *Elephas maximus asurus* (Mesopotamia), *Elephas maximus eondaicus* (Java) and *Elephas maximus rubridens* (China).

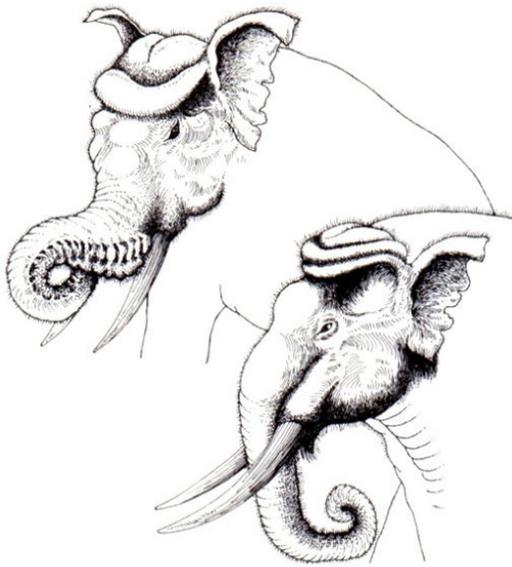
The extinct elephant species were living 100,000 years before have been reported as *Hypselephas hysudricus sinhaleyus* by Deraniyagala (1937) and as *Elephas hysudricus* (Manamendra-Arachchi 2008). *Elephas maximus sinhaleyus* was secured in 1947 from a gem pit about four miles away at Pahala Vela, Galadande Mandiya, Gonapitiya, Kuruwita near the Kuru Ganga. The fossils were laid upon the gem field at a depth of 6.5m below the surface, and yielded *Elephas maximus sinhaleyus* (Deraniyagala 1958). It frequently occurs in association with hippopotamus fossils from Gatahatta as far as Ratnapura, and with rhinoceros from Gatahatta to Pelmadulla.

The origin of *Elephas maximus* remained unknown until 1936, when its fossils were discovered in Sri Lanka, and even as recently as 1942 the general opinion was that nothing was known of its origin except that it appeared suddenly rather late in the age of man. It is true that a few isolated fossil proboscidean molars were assigned to an extinct Japanese race of this elephant named *Elephas maximus buski* (Deraniyagala (1958), but actually these belong to *Palaeoloxodon namadicus naumanni*, and no *Elephas maximus* fossils were found in Japan. In various other countries also isolated and often fragmentary teeth have been ascribed to *Elephas maximus*, but in every instance these have proved to be either those of the extinct *Palaeoloxodon namadicus* or the remains of some subspecies of *Elephas maximus* that had become extinct during prehistoric or historic times.

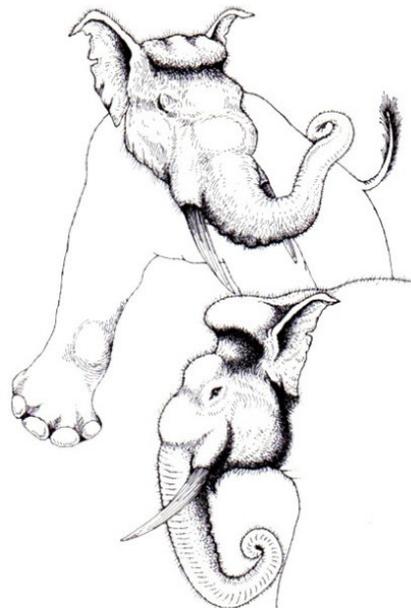
Since its earliest remains occur only in Sri Lanka, *Elephas maximus* apparently evolved from some Plio-Quaternary proboscidean which had become isolated here upon the Island's separation from Asia. During a Pleistocene reconnection with India the Ceylon

animal had invaded the mainland and wandered northwards until it encountered the Himalayan massif, whereupon it had spread along its base eastwards as far as Wallace's line (the Wallace's Line is a boundary that separates the eco-transitional zone between Asia and Australia). West of the line are found organisms related to Asiatic species; to the east, a mixture of species of Asian and Australian origin are present, and westwards until checked by the Mediterranean sea and the deserts of Arabia and North Africa. Over this vast expanse, in a belt stretching from 40 degrees north to 10 degrees south, land subsidence, changing river systems, deepening river gorges and expanding deserts, assisted the mountain ranges as barriers, and resulted in the evolution of twelve (12) subspecies (Deraniyagala 1958).

Distribution of the Asian elephant *Elephas maximus maximus* is confined to the island of Sri Lanka, *Elephas maximus sumatranus* to the island of Sumatra, and *Elephas maximus indicus* occupies the rest of the range. Ten fossil species of *Elephas* were recognized; the earliest is from the middle Pliocene Ekora beds, southeastern Turkana, Kenya, formed about 4.5 million years ago (Shoshani and Eisenberg 1982). Two of these species are native to Africa and three to southern Asia.



**Fig 03** : *Palaeoloxodon namadicus sinhaleyus* is one of extinct elephant species in sri lanka. Illustrated by: Deraniyagala (1958)



**Fig 04** : *Hypselephas hysudricus sinhaleyus* is one of extinct elephant species in sri lanka. Illustrated by Deraniyagala (1958)

The rhinoceros family is characterized by its large size (one of the largest remaining megafauna), with all of the species able to reach one tonne or more in weight; an herbivorous diet; and a thick protective skin about 1.5–5 cm thick, formed from layers of collagen positioned in a lattice structure; relatively small brains for mammals this size (400–600g); and a large horn. They generally eat leafy material, although their ability to ferment food in their hindgut allows them to subsist on more fibrous plant matter, if necessary. Unlike other perissodactyls, the African species of rhinoceros lack teeth at the front of their mouths, relying instead on their powerful premolar and molar teeth to grind up plant food. Both African species and the Sumatran Rhinoceros have two horns, while the Indian and Javan Rhinoceros have a single horn. Rhinoceros was living 80,000 years before.

Most known fossil remains of *Rhinoceros unicornis* appear to be of probably middle Pleistocene. The direct precursor of the living Indian rhinoceros was *Rhinoceros unicornis fossilis* (synonyms *sioalensis* and *palaeindicus*), from the upper Siwalik beds, within the known historic range of the species. *Rhinoceros namadicuss* from the Narbada or Narmada beds is probably synonymous with *Rhinoceros unicornis fossilis*. *Rhinoceros kendengindicus* Dubois from Java was closely related to the present species and should probably be regarded as a subspecies of it; *Rhinoceros unicornis kendengindicus* occurred in the Djetis and Trinil beds alongside *Rhinoceros sondaicus*, but has not been found in the Upper Pleistocene Ngandong deposits where the latter is the only rhinoceros. The various fossils of this genus from China can be referred to two species: the Pleistocene *Rhinoceros sinensis* Owen, which though in many respects is intermediate between the two living species, shows progressive characters linking it to *Rhinoceros unicornis* and the Upper Pliocene species *Rhinoceros oweni* Rmgstrom, which was placed in a separate genus *Sinorhinus* (Laurie et al 1983).

***Rhinoceros sinhaleyus*, 1936 (extinct)**

Rhinoceros, also known as rhino,

The findind about rhinoceros indicated about Deraniyagala two species, the older, less developed one, the *Rhinoceros sinhaleyus* Deraniyagala 1936, which has squarer and lower teeth than the more rectangular-toothed *Rhinoceros kagavena* in the Ratnapura fauna of Sri Lanka. The former became extinct earlier, in Deraniyagala view (1958). Rhinoceros fossils were found from Kuruwita gem pit, 6.0m beneath from the surface at Hiriliyadda, Talavitiya (Kuruwita), which is undated but probably Middle Pleistocene (Deraniyagala 1958). This

form shows few characters to differentiate it from *Rhinoceros unicornis*, and like the Javanese fossil occurs alongside a race of *Rhinoceros unicornis*.

Rhinocerotidae of large heavyset herbivorous perissodactyl mammals of Africa and Asia that have one or two upright keratinous horns on the snout and thick gray to brown skin with little hair. The order Perissodactyla is only represented in Sri Lanka by the superfamily Rhinocerotidae.

### ***Hexaprotodon sinhaleyus*, 1937 (extinct) Hippopotamus**

The hippopotamus (*Hippopotamus amphibius*), or hippo, from the ancient Greek for "river horse", is a large, mostly herbivorous mammal in sub-Saharan Africa, and one of only two extant species in the family Hippopotamidae, the other is the Pygmy Hippopotamus. After the elephant, the hippopotamus is the largest land mammal and the heaviest extant artiodactyls, despite being considerably shorter than the giraffe. The hippopotamus is semi-aquatic, inhabiting rivers and lakes where territorial bulls preside over a stretch of river and groups of 5 to 30 females and young. During the day they remain cool by staying in the water or mud; reproduction and childbirth both occur in water. They emerge at dusk to graze on grass. While hippopotamuses rest near each other in the water, grazing is a solitary activity and hippos are not territorial on land.

In 'the Pleistocene of Ceylon' Deraniyagala (1936, 1939, 1944 and 1958) explains his findings of *Hexaprotodon sinhaleyus* and *Hexaprotodon sivalensis sinhaleyus* based on gem pits in the Ratnanapura area about seven km away at Pahala Vela, Galadande Mandiya, Gonapitiya, Kuruwita near the Kuru Ganga. The fossils were laid at a depth of 6.5m below the surface.

Accordingly, Deraniyagala revealed the fossilized remains of the lower jaws and teeth of a Sri Lankan hippopotamus. The lower jawbone of the hippopotamus reveals six incisor teeth, whereas the hippopotamus that survives in Africa has only four incisors. The extinct Ceylon hippopotamus has been named the *Hexaprotodon sinhaleyus*. The change in climate from heavy rainfall that fed numerous large rivers and lakes to a more moderate rainfall that reduced the island's waterbodies was probably responsible for the extinction of the world's second heaviest land mammal in the island (Deraniyagala 1958).

The earliest known hippopotamus fossils, belonging to the genus *Kenyapotamus* in Africa, date to around 80,000 years before present. Hippopotamus and Rhinoceros were living 80,000 years before present. The extinction of this animal might have occurred sometime shortly after the middle Pleistocene times, since its nearest relative, the extinct Indian hippopotamus from former lake beds which are now traversed by the Nerbudda (Narmada) River, became extinct in middle Pleistocene times about 50,000 years ago.

## **CONCLUSION**

End of Pleistocene the climate change resulted in the extinction of a number of animals & fossilization in alluvial beds. The last ice age ended about 14,000 years ago (temporary), but we cannot be certain that this was related to the Earth's precession. [The Earth's axis rotates (processes) just as a spinning top does, the period of precession is about 26,000 years. Therefore, the North Celestial Pole will not always be point towards the same star field, precession is caused by the gravitational pull of the Sun and the Moon on the Earth. However earth's precession was tend to stimulate the increase of temperature & patterns of extinction, distribution, evolution as a result of changing geomagnetic field. This extinction wave did not stop at the end of the Pleistocene, but continued due to the sea level fluctuations, especially on isolated Islands in Holocene epoch. Among the main causes hypothesized by paleontologists and sedimentologists are natural climate change and overkill by humans. With the technological and cultural development of the humans, who appeared during the Middle Pleistocene and invaded many previously uninhabited regions of the world during the Late Pleistocene and Holocene.

Eminent paleontologist, zoologist, and also an artist Deraniyagala from Sri Lanka has been specialized in fauna and human fossils of the Indian subcontinent. By Late Jurassic Period Sri Lanka was positioned within 67°S - 65°S and 32°E - 36° E in the southern hemisphere and by the end of Miocene Period Sri Lanka located itself between 4°N - 8°N and 77°E - 79° E in northern hemisphere (Katupotha 2013). Jurassic and Miocene fossils from Sri Lanka are very significant to compare those with other locations of the world and very useful to the study of evolutionary stages through the climate changes of Sri Lanka. But, whole the country has subjected to Quaternary glacial cycles due to the advancing and retreating continental glaciers; warmer, cooler and dry climatic conditions; evolution of hominids and

associated cultures, and also extinction the megafauna; deposition of terrestrial and marine deposits, and the development of soil. Due to this evolutionary process some ancestors of former geologic periods were extinct, some were adopted and others were newly evolved.

Fossils found in Sri Lanka from different eras. Though we have number of fossils yet there is no law or an act has been made to protect and preserve these fossils. Therefore palaeo – Biodiversity heritage in Sri Lanka is being gradually destroyed by direct human activities. Today for gem industry people using bacos to dig gem pits in Sabaragamuwa basin. Because of using bacos fossils that are in Pleistocene era are getting destroyed. Therefore Eco Astronomy Organization has started to preserve the animal and plant fossils that have been found in Sabaragamu basin during 1990-2013. As a first step of this the main information of Sabaragamu basin fossils has published as a research papers. The Eco Astronomy Organization have planned to exhibit and preserve fossils through Project Batadoba Geo Tourism with help of provincial council and other government organization

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