First Evidence of Miocene Avian Tracks from Sumatra

Short Announcement

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The islands of oceanic southern Asia (Indonesia, Malaysia, and New Guinea) have played an influential role in the development of evolutionary thought, initially because of the historic studies by Alfred Russel Wallace and later by the discovery of Pleistocene human remains on Java by Eugene Dubois. Unlike the majority of Sunda Islands, much of the central core of Sumatra was emergent from the early Eocene through the early Miocene. Freshwater lacustrine sediments of the early Eocene Sangkarewang Formation have yielded an abundant diversity of fishes and a single bird skeleton but no other evidence of terrestrial vertebrates is known until the Pleistocene. In the summer of 2007 a reconnaissance survey of Cenozoic sediments were initiated in the Ombilin Basin located in the Barisan Mountains of central Sumatra (Figure 1).The outcrops are well exposed in Sawahlunto and Ombilin Coal Mining areas and consist of alternating conglomerates, quartz sandstones and shale. In addition to exploring the Sangkarewang Formation we examined sediments of the Sawahlunto and overlying Sawahtambang formations which span the early part of the Miocene. In the Sawahlunto Formation we discovered two series of avian tracks representing two different shorebirds (Figure 2). These tracks were found at the base of a thinly laminated, coarsening upward sandstone overlain by a relatively thin layer (0.5 meter) of coaly shale, followed by a quartz-sand conglomerate at the top of the local section (12 meters total thickness). The sandstone contains carbonaceous debris and small to medium, parallel ripples are formed (Figures 3). One set of tracks has an angle of 90 degrees between digits one and three and is of relatively small size and probably represents a gruiform (rail). The second set of tracks has a 120 degree angle between digits one and three and was likely made by a charadriid (plover) or scolopacid (sandpiper) shorebird (Figures 4 and 5). In addition to the bird tracks, small, circular traces (Skolithos ichnofacies) are present probably representing tubes of suspension feeding invertebrates such as clams or worms (Figure 6). The presence of these

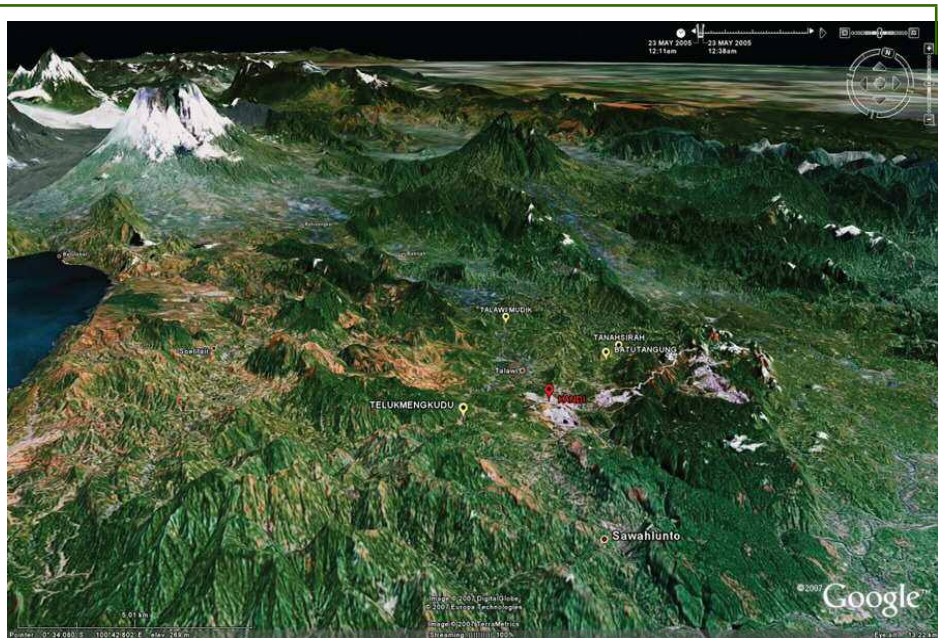
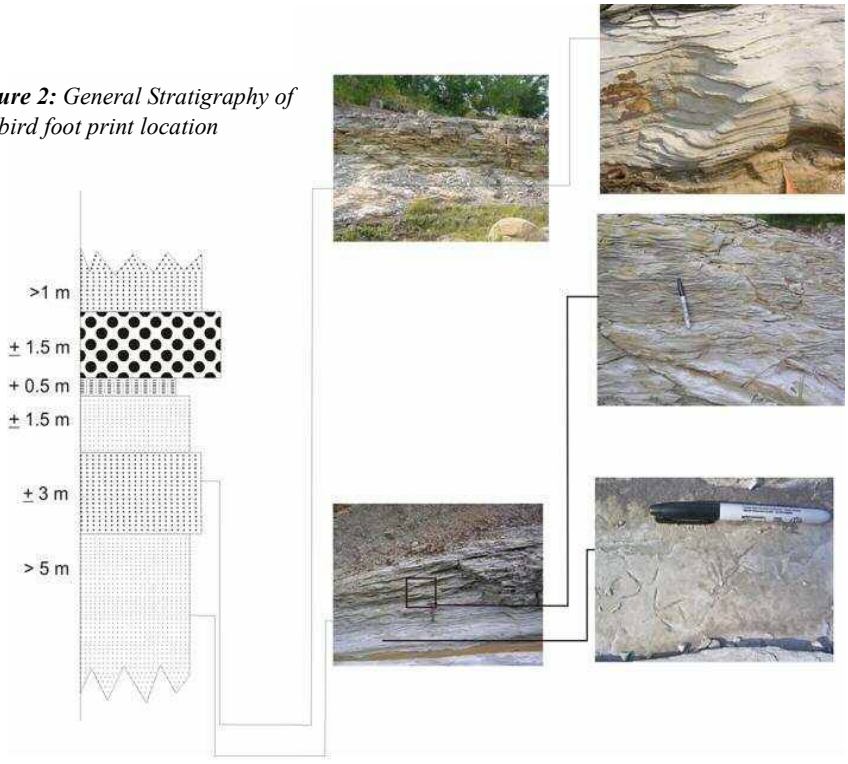


Figure 1: *Ombilin Basin located in the Barisan Mountains of central Sumatra. On the left is Singkarak Lake (Picture from Google Earth,2009)*

Figure 2: *General Stratigraphy of the bird foot print location*



traces suggests that the bird tracks were formed on an intertidal beach and the birds may well have been feeding on these invertebrates. The presence of these track ways suggest that further exploration of Tertiary sediments in Sumatra is warranted. The avian tracks from the Sawahlunto Formation are as the first discovery of the Bird Footprint Fossils in Indonesia.

Figure 3: *Outcrop shows the sandstone contains carbonaceous debris and small to medium, parallel ripples. The avian tracks are found at the base of this outcrop.*

Figure 4: *First discovery of avian tracks, the Bird Footprint Fossils in Indonesia from Sawahlunto Formation of Early to Middle Miocene in age.*

Figure 5: *One set of tracks has an angle of 90 degrees between digits one and three, probably represents a gruiform (rail), and the second set of tracks has a 120 degree angle between digits.*

Figure 6: *Small, circular traces (Skolithos ichnofacies) are probably representing tubes of suspension feeding invertebrates.*