Where are all the pre-Pleistocene Giant Landslide Deposits?

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An article appeared in the perspectives section of the April 1, 1994, **Science** that likely was little noticed by either creationists or evolutionists. This was a report on the discovery of giant underwater landslides around Hawaii.[1]

In 1983, President Ronald Reagan claimed for the United States all offshore areas within 370 km of any US territory. It was the job of the US Geological Survey (USGS) to map the sea bottom of this newly claimed US Exclusive Economic Zone. So, the USGS took on this task, which included an area of ocean floor that extended on either side of the Hawaiian Ridge, a linear chain of volcanoes about halfway between Australia and the United States. This ridge stretches from the Hawaiian Islands, about 20°N, 155°W, west northwest to around Midway Island, around 30°N, 179°W.

Using the GLORIA side-scan sonar system, USGS ships took seismic profiles of the 2,380,000 sq km area. To their astonishment, they discovered many giant landslides on the submarine flanks of the Hawaiian Ridge. Seventy slides at least 20 km in length covered half the area. Some of the landslides flowed over 200 km, and some had debris volumes exceeding 5,000 cubic km. Rapid movement was noted during single events by thin, far-reaching landslides that sometimes flowed uphill. Blocks of rock up to 10km long have been transported tens of kilometres.

These large landslides are capable of causing large tsunami-generating earthquakes, which may account for some of the large shocks measured in Hawaii during historical times. Landslide-induced tsunamis may explain coral-bearing marine conglomerates on some of the Hawaiian Islands. One of these deposits is believed to have reached as high as 325 m on the island of Lanai, Hawaii.

Landslide deposits are not unique to just the Hawaiian Ridge area. As recently as the 1960s, such catastrophic submarine landslides were considered rare, except on very steep slopes, offshore of deltaic environments, and in active seismic zones.[2] Now submarine landslides are known from the continental margins from all over the world:

> *'Many submarine landslides, ranging widely in size and geologic setting, have now been documented worldwide.'*[3]

For instance, the continental slope off eastern North America is incised by almost wall-to-wall canyons, often with side canyons, caused by submarine sliding.[4] Moreover, these landslides cover up over 40 per cent of the sea floor on the continental rise, and some extend over the deep abyssal plains.[5] The largest undersea landslide so far detected covers about 80,000 sq km off the east coast of South Africa.[6] Most interesting, these landslides can sometimes develop on ocean floor slopes of only a few degrees and travel over a slope as low as 0.1° for a distance of hundreds of kilometres.[7,8]

A number of mechanisms can trigger submarine landslides. These mechanisms include earthquakes, volcanic eruptions, sediment overloading, erosion of the lower reaches of a slope, atmospheric storms, and gas generation within the sediments.[9]

The Hawaiian Ridge observations brought up three main questions to the geologists:

> *'How do the debris avalanches carry blocks 10 km in size, perhaps rapidly, more than 50 km down a slope averaging less than 3°? What effects do such landslides have on the sedimentary record? How might their deposits be recognized in ancient deposits?'*[10]

The first question has not been adequately solved, and there is an extensive literature on not only the fluid dynamics of such large slides, but also on even the classification of various mass movement products.

I want to focus attention on the second and third questions. These, as it turns out, have considerable significance to the creation/evolution controversy. Specifically, the questions relate to the mode of deposition of most sedimentary rocks over the earth. The main problem is that there are very few large landslide deposits recognized in the pre-Pleistocene sedimentary record, according to the standard geological time-scale. Most, if not all, of the large slides recently recognized are from Recent, Holocene or Pleistocene sediments. There are small slides and slumps observed in pre-Pleistocene sedimentary rocks of the earth, to be sure, but very few slides on the scale seen on the bottom of the current oceans:

> *'A striking discrepancy is shown between the sizes of submarine slide or slump sheets recognized from seismic profiling on present continental margins and the sizes of possibly analogous sheets described from the ancient onland record. The recent slides are, on average, several orders of magnitude larger in cross-sectional area than their supposed ancient equivalents.'*[11]

Where are all the ancient large landslide deposits that should be easily observed — if the sedimentary rocks accumulated very slowly over vast eons of time? Much of the pre-Pleistocene sediment accumulated in vast linear troughs, once called geosynclines, which are analogous to the continental margins. Large landslides should easily have been generated by all the many mechanisms of landslide generation listed above.

The evidence cannot be washed down a subduction zone because many landslides have been observed on both sides of the North Atlantic Ocean, which are passive margins not currently undergoing subduction according to the plate tectonic paradigm. Besides, most of the pre-Pleistocene sedimentary record is exposed on continents which mostly float on top of these plates.

Woodcock[12] discusses a few possibilities for accounting for such a large discrepancy, but eliminates all of them, except for the possibility that geologists have misinterpreted slide deposits and subsumed them into some other tectonic mechanism. He half-heartedly suggests nappes and overthrusts could represent ancient analogues of Recent, Holocene and Pleistocene submarine slides. The main problem with this suggestion is that landslide debris is almost thoroughly broken up and mixed, while most assumed nappes and overthrusts generally have intact sedimentary rocks that are usually parallel to the bedding below. Woodcock concludes:

> *'We are left, therefore, with the dilemma of an important and well documented recent structural process which does not seem to be adequately represented in the geological record.'*[13]

The lack of pre-Pleistocene giant submarine slides is another instance in which the present is not the key to the past. The paradox suggests that the sediments did not accumulate over eons of time but in an instant geologically. I suggest that the Genesis Flood is not only an adequate mechanism, but possibly the only mechanism that can account for the lack of giant submarine slides in the pre-Pleistocene rock record.

Since the rapid sedimentation, seismic shaking, tectonics, etc. during the Flood would have been extremely conducive to huge submarine landslides, the lack of these slides can tell us more about the Flood process. Missing giant slides in sedimentary rocks suggests that the rocks that are preserved from the Flood were deposited in thick accumulations in giant troughs or basins, where they could not slough somewhere else. Moreover, most of these sediments must have quickly hardened so that further tectonic action did not start them sliding.

I also suggest that some of the Flood-deposited sediments did slide off into basins and are the pre-Pleistocene 'Ice Age' deposits called 'tillites'.[14,15] Tillites are the presumed hardened equivalents of glacial till. The structure of landslide deposits looks exactly like till, and even mimics glaciomarine deposits near marine ice sheets. Submarine mass flows can duplicate most, if not all, special features found in these 'tillites' that are attributed to ancient Ice Ages.[16,17] However, the total volume of 'tillites' is too small, compared to the rest of the sedimentary rocks, to account for the mystery of the missing giant landslide debris from pre-Pleistocene sediments.

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