The greatest weight is given to obscure geophysical evidence, while the most obvious and readily available evidence, the topography, is ignored. Yet, as Petriovsky (1985) expressed it: «The study of the relief of the earth is much easier and cheaper than the study of the earth's depths and uses direct observation».

Ideas about mountain building have been subject to fads throughout the history of earth science. The shrinking earth, geosynclines, and latterly plate tectonics have all provided «answers», usually flawed by the scientific fallacy of a single cause, and biased by selective evidence and the rule of dogma.

Gansser (1991) wrote «During the classical exploration in the 19th and early 20th centuries the ratio between facts and theories was 1:0.5. Plate tectonics changed it to 1:3 and with geophysics, geochemistry and structural analysis the ratio became 1:5». I suspect that with the dominance of modelling it is now 1:10. It would be nice to reverse this sorry state of affairs. This paper is an appeal to geomorphologists to start from their own factual information in the study of major landforms, rather than follow simplistic theories derived from other sources.

4. CONCLUSIONS

4.1 Rock structures under plains, plateaus or mountains may not be the cause of the plain, plateau or mountain.

4.2 Plains are made by erosion, and vertical uplift of plains creates plateaus.

4.3 Mountains are usually plateaus or eroded plateaus.

4.4 Some structures, especially monoclines and vertical faults, may be associated with uplift.

4.5 There are no fold mountains. Most folding of rock has nothing to do with mountain building, and is usually much older.

4.6 A plateau may spread laterally after uplift, with the formation of thrust faults and related structures.

4.7 Deep incision of a plateau can cause isostatic response, with formation of new structures including anticlines along major valleys and even major mountain ranges.

4.8 Major drainage patterns are on the same time scale as global tectonics, and often pre-date the formation of rift valleys, mountain ranges or continental margins.

4.9 Theories of mountain building must explain both the period of tectonic quiet that permitted erosion of a planation surface, and the usually young and rapid uplift that made a plateau.

4.10 Subduction is a continuous and long lived process that does not readily explain either the tectonic quiet, or the young and rapid uplift of most mountains.

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Most mountain ranges are eroded plateaus, which were once low-level planation surfaces that cut across older bedrock structures. This concept is illustrated by examples including the Kimberley Plateau, Rocky Mountains, Andes, European Alps, Apennines, Himalayas, Drakensberg and Appalachians. In any theory of mountain building it is essential to separate pre-planation from post-planation structures. Most nappes, fold belts and granitic intrusions commonly associated with mountains are pre-planation features. Steep faults and gravity spreading structures may be post-planation features. Major drainage lines are sometimes older than mountain ranges or continental margins. Major valleys may be big enough to cause isostatic compensation sufficient to cause local anticlines, and uplift of whole ranges. Mountains on passive margins cannot be created by subduction. Vertical movement dominates mountain building, and in many instances uplift is Plio-Pleistocene. Any tectonic explanation should account for both the tectonic stability that permitted planation, and the rapid vertical uplift. Subduction is supposed to occur continuously over tens or hundreds of millions of years, so it not a likely explanation of such mountains.

KEY WORDS: Mountains, Plateaus, Planation surfaces, Drainage patterns, Uplift, Isostasy.

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