NEWS IN BRIEF

Oceanic seismic layers 2A, 2B and 2C have been drilled in the first complete section extending into what is regarded as a true ophiolite complex. DSDP hole 504B, located 201 km south of the Costa Rica rift on the most easterly arm of the Galapagos spreading centre, was sited on magnetic anomaly 3' which has an estimated age of 6.2 Ma. From the sea floor down to 275 m the hole intersected layer 1 – siliceous nannofossil oozes grading into chert at their base. At 275 m "basement rocks" were reached, and from here to 846 m the drill passed through pillow lavas, flows and breccias. The upper part of this zone contains open fractures and is correlated with layer 2A; the lower part where the fractures are filled with smectite correlates with 2B. Between 846 and 1055 m was a transition zone of pillows and minor flows cut by dykes. Below 1055 m the hole intersected layer 2C – a sheeted dyke complex characteristic of ophiolite complexes. These results, reported in Nature, December 16, 1982, confirm for the first time that an idealized ophiolite sequence as defined from terrestrial exposures does exist in the oceanic crust.

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As known for several years now, clays at the Cretaceous-Tertiary boundary in many localities are enriched with trace metals and 20-160 times background levels of iridium. This has led to suggestions that the clay, or part of it, formed as a result of a global impact event from a mixture of terrestrial ejecta and meteoritic material. **M.R. Rampino** and **R.C. Reynolds** (U.S.A.) have now analyzed the mineralogy of these clays from key localities in Denmark (Nye Kløv), Italy (Gubbio), Spain (Caravaca) and Tunisia (El Kef). As reported in Science, February 4, 1983, at Nye Kløv the boundary clay is probably a bentonite, whereas at Caravaca and El Kef it appears to be altered bentonite with large amounts of kaolinite. The Gubbio clays are dominated by detrital illite and kaolinite.

There is no evidence of exotic or unusual mineralogy, even in the lowermost samples in the boundary clay. The assemblages are typical of Cretaceous marine limestones and mud rocks, and non-indigenous ejecta, if present, cannot amount to more than a few per cent of the amounts implied by the impact hypothesis. The mild degree of diagenesis found lends no support to the idea of diagenetic elimination of fine-grained non-clay minerals. The authors propose therefore that the clays originated by alteration of glassy volcanic ash produced by late Cretaceous volcanism, presumably high in Ir and trace metals.

Another alternative has been offered by Rampino in the new GSA special Paper 190, "Geological Implications of Impacts of Large Asteroids and Comets on the Earth". Here he concludes that even if the anomalous Ir and related siderophile elements were of extraterrestrial origin, they could represent background meteoritic debris concentrated locally in the boundary clay as an insoluble residue after the widespread dissolution of pelagic limestone.

However, in the same GSA Special Paper **J.C. Varek** and **E. Thomas** report finding microtectite-like particles in several samples of the boundary clay. They regard these as supporting an impact event, even though their enrichment in chalcophile and volatile elements (even Ir) may have been due to terrestrial processes related to ridge-crest volcanism. Their work indicates that "characterization of an impactor simply from sediment geochemistry is erroneous."

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The use of the well-known Streckeisen quartz-alkali feldspar-plagioclase (QAP) plot for granitoid rocks has now been extended well beyond the purpose of systematic classification originally intended by the IUGS Subcommission which designed it. **J. Lameyre** and **P. Bowden** writing in the Journal of Volcanology and Geothermal Research (vol. 14, 1982, p. 169-186) use the diagram to identify various granitic series and their related intermediate basic counterparts. Their QAP plot defines a tholeiitic series, a calc-alkaline series (with low, medium and high K variants), and alkaline series represented by aluminous granites of alkaline provinces and by alkaline and peralkaline granites. These series all trend from basaltic compositions to granitic differentiates. A separate trend is also recognized for mobilizates and related granitoids formed by crustal fusion and showing no basic magmatic associations. The authors regard it as possible to use these plots even in the field to obtain an idea of magmatic lineage, if one takes into account the whole magmatic assemblage and especially the enclaves of magmatic origin.

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The geological connection between west Antarctica and the southern Andes suspected since the time of Suess was reviewed recently in a special issue of the Journal of the Geological Society of London (vol. 139, no. 3). As **P.W.G. Tanner** notes in his introduction, this connection has arisen from the more-or-less continuous subduction of the Pacific plate beneath the western margin of the region over the past 200-300 Ma. Indeed the evidence suggests that subduction and magmatic arc activity in southern South America began as early as Devonian-Carboniferous, though such early processes have not yet been recognized in west Antarctica. From the Triassic to the Jurassic the connection between the two magmatic arcs was linear, with both founded on continental crust.

The separation of Africa from South America was accompanied by the opening of a major back-arc basin in the southern Andes during the late Jurassic to earliest Cretaceous, and the histories of the two regions began to diverge. Back-arc sedimentation and deformation continued in the Magallanes Basin of South America while the major basin contents were being deformed in the mid-Cretaceous. However, no back-arc basin appears to have developed when east Antarctica separated from the Antarctic Peninsular during the opening of the Weddell Sea. Nor has any evidence of mid-Cretaceous deformation been found in the back arcs of the northern Antarctic Peninsula. Thus the linear pattern of fore arcs, magmatic arcs and back-arcs was disrupted and offset following the early Cretaceous break-up of Gondwana, and especially by the Cenozoic opening of the Scotia Sea.

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From a Chinese publisher rejecting a manuscript from a British author, "We have read your manuscript with boundless delight. If we were to publish your paper it would be impossible for us to publish any work of a lower standard. And as it is unthinkable that, in the next thousand years, we shall see its equal, we are, to our regret, compelled to return your divine composition, and beg you a thousand times to overlook our short sight and timidity". (World Development)

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The major rivers of the world – those with annual sediments discharges of 15 x 10^6 tons – contribute about 7 x 10^9 tons of suspended sediment per year to the oceans. Adding estimates for all drainage basins and for bedloads and flood discharges gives a total of 16 x 10^9 tons per year. These figures were published recently by **J.D. Milliman** and **R.H. Meade** (Journal of Geology, vol. 91, p. 1-21, 1983) in a survey of global sediment delivery by rivers to the oceans, based on new data for many of the world's major rivers.

They point out that the annual sediment discharge from large African rivers is relatively small (175×10^9 t/yr), with a major drop in recent years due to the ponding of sediment in the Nile River by the Aswan Dam.

On the other hand the large islands of the western Pacific (Japan, Philippines, Indonesia, New Guinea, etc.) are among the most "prodigious producers of river sediment," because of their active tectonism and volcanism, steep slopes, heavy rains and intense human activity. The most spectacular contributor is Taiwan, whose annual river sediment load of about 300×10^6 tons is only slightly less than that of the conterminous U.S. The authors caution against extrapolating these data backwards in time since climatic and erosional regimes have changed markedly, and man has strongly affected today's river sediment load through the construction of dams and reservoirs, crop farming, deforestation, and in many areas, poor soil management.

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Recent data from western Irian Jaya, gathered in a joint Australian-Indonesian mapping project, throws new light on the age of the Banda Sea of eastern Indonesia. Bordered by Sulawesi and the Buton microcontinent to the west, the Banda arc to the south and east, and the Buru-Seram and Banggai-Sula microcontinents to the north, the Banda Sea appears to be floored by oceanic crust of Jurassic age to the north and Cretaceous to the south. Recent mapping reported by **C.J. Pigram** and **H. Panggabean** in Nature January 20, 1983, has shown that the post-breakup unconformity in west Irian Jaya is early Jurassic in age, whereas to the south in northwestern Australia it is 10 Ma younger (Bajocian). The southward younging of breakup events suggests that the rift-drift sequence in west Irian Jaya was a consequence of the breakup of Gondwana which led to the opening of the Indian Ocean. The age of the onset of spreading in the Banda Sea suggests that it is also related to the opening of the Indian Ocean and that it may represent a trapped piece of the Indian Ocean floor.

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The United Nations Convention on the Law of the Sea (LOS), the culmination of nine years' work, was signed in Kingston, Jamaica, on December 10, 1982 by representatives of 118 nations. The U.S.A. opposes the treaty and has not signed, nor have Britain, West Germany, Belgium, Japan, USSR and 17 others, though some of these have indicated their intention to do so at a later date. A preparatory commission was due to begin work in March on two main institutions established by LOS: the International Sea-Bed authority (ISA) to be based in Jamaica and the International Tribunal for the LOS to be located in Hamburg, F.R.G. The ISA will organize and control all exploration and exploitation activities on the resources of the sea-bed and ocean floor beyond limits of national jurisdiction.