

the Purana basins, Aravalli mountains, Singhbhum terrain and Quartz-pebble conglomerates have already rendered obsolete a good amount of data in the new book. This is perhaps inevitable in the face of rapid progress in the publication scene. The authors also do not have access to the valuable unpublished information from Government agencies, which if available, would have placed the geological base on a sounder footing. These odds and the authors' own predilections have in no way diminished the usefulness of this valuable work. Students will find it a ready source-book and the libraries a precious addition.

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Notes

EXPANDING EARTH

Thanks to the publication of the Geological Atlas of the World (UNESCO) on scale of 1 : 20,000,000 under the editorship of G. Choubert and A. Faure Muret it has become possible to make a quantitative study of the distribution of areas of oceanic crust by individual epochs, both for the world as a whole and for the individual oceans.

Study of the zonation of ocean floor (N. YA Osipishin and V. F. Blinov, Published in *International Geology Review* vol. 29, September 1987, pp. 1009-1020) has shown that the largest part of the oceanic crust consists of young zones. This indicates an accelerated process of formation of oceanic crust. This age zonation is believed to have arisen as a result of uncompensated spreading associated with expansion of the earth.

ASTERIOD IMPACT IN LATE PLIOCENE

A recent letter in *SCIENCE* (Vol. 241, 1st July, 1988, pp. 63-65) reports of new evidence of impact of an asteriod spread out at least 600 km of the ocean floor in the South Pacific. The stratigraphic age of this impact is the same as that inferred from the onset of glaciation in the northern hemisphere.

HYDROTHERMAL TRANSPORT OF PLATINUM GROUP ELEMENTS AND GOLD

The possibility of hydrothermal transport of Platinum Group Elements (PGE) has been attracting considerable attention in recent years due to the unambiguous recognition of hydrothermally deposited/redeposited PGE in many Cu-Ni deposits, unconformity related uranium deposits etc. The role of hydrothermal processes in the transport of PGE assumes importance in locating suitable geological environments like shear zones, unconformities, etc., where the mobilised and concentrated PGE from primary magmatic sources can become economically significant.

Subhash Jaireth (University of Roorkee) has undertaken a preliminary theoretical investigation on the hydrothermal transport of gold and platinum in subcritical aqueous solutions at temperatures between 25° and 250°C based on available thermodynamic data on the aqueous species of platinum and gold in the systems Pt-Cl-N-O-H(S) and Au-Cl-S-H-O respectively. The study has been carried out at the Bureau of Mineral Resources, Canberra, Australia, under a National Fellowship and the results have been brought out as a Record (1988/9) of the Bureau entitled 'Hydrothermal transport of Platinum and Gold in unconformity related Uranium Deposits; A preliminary Thermodynamic investigation'.

Jaireth attempts to apply the results obtained in the genesis of the PGE-Au in the unconformity related Coronation Hill uranium deposit, Northern Territory, Australia. Here, the U-mineralization is accompanied by Ni, As, Co, Au, Ag and PGE mineralisation. The gold ore in this deposit has an average tenor of 5 g/t with around 0.60 g/t Pt and 1.3 g/t Pd. The gold-bearing veins cut across the pitchblende mineralisation and the PGE show close spatial association with gold.

The salient conclusion of the thermodynamic study with regard to the transport of PGE is that chloro-complexes (Pt Cl_4^{-2} and Pt Cl_6^{-2}) directly influenced by atmospheric oxygen with a high redox state buffered by the oxidation phases of the surface, subsurface or sea-floor weathering regime (Mn-oxides primarily), are the only geologically realistic fluids with potential for PGE transport. Such chloride-rich fluids can transport up to 1 ppb of Pt at 250°C. A saline fluid with direct atmospheric contribution of oxygen would provide a good transporting medium for Pt in the form of chloro-complexes at all temperatures. Such saline, acidic and oxygen saturated fluids can also transport significant gold. Reduction of oxidised phases due to reaction with magnetite and or graphitic rocks deposit most of the dissolved platinum as well as gold.

This preliminary thermodynamic study is of interest to all those engaged in PGE/Au exploration work, for a sound theoretical understanding of the transport and solution-equilibria of PGE and gold and the inferences on possible geological environments facilitating such transport.

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