"THE PUU OO ERUPTION OF KILAUEA VOLCANO, HAWAII: EPISODES 1 THROUGH 20, JANUARY 3, 1983. THROUGH JUNE 8, 1984." USGS Professional Paper, 1463, Edited by Edward W. Wolfe, 251 pp., 1988.

A comprehensive study of the first $1\frac{1}{2}$ years of the most voluminous eruption of Kilauea Volcano, Hawaii, in historical time, is presented in the above USGS Professional Paper with some superb illustrations of the dynamics of the eruptive episodes.

The present Puu Oo eruption which began on 3rd January 1983 has been characterised by episodic, relatively brief periods of vigorous fountaining and high volume flow production, alternating with longer repose periods. Up to 47 distinctive eruptive episodes have occurred up to June 1986, making the Puu Oo Eruption the most voluminous in historical time. The first $1\frac{1}{2}$ years of the eruption yielded $240 \times 10^6 m^3$ of new basalt, building a cone of 130 m height at the principal vent and the aerial spread of the basalt extended over $30 \times 10^6 m^2$ of the rift zone and southern flank of the volcano.

The initial outburst was a fissure eruption. This fissure system extended progressively farther downrift nearly 8 km in a 4-day period, before the extrusive activity became localised along a 1 km long segment of the fissure system south of Puu Kahaualea. During the subsequent seventeen months, 19 brief episodes of 9 hours to 12 days duration with vigorous fountaining and high volume emission of lava flows alternated with longer repose periods of 8 to 65 days. During the eruptive episodes harmonic tremor was at high levels and rapid subsidence occurred at the Kilauea's summit. During repose periods, the harmonic tremor was continuous but low and Kilauea's summit inflated. After the first episode of fissure outbreak, central vent eruptions dominated.

The height of the fountain reached a maximum of 400 m. The average velocity of the main river-fed flows normally ranged from 50 to 300 m/h and a few from 400–500 m/h. The average velocity increased through the series of eruptive episodes reflecting a decrease in viscosity and increase in rate of discharge.

Several hundred lava temperature measurements done between the first and 11th eruptions show a steady increase in the pahoehoe temperatures from a range of 1098°–1125°C during the first episode to 1133°–1144°C during episode 11.

Compositional variations during episodes 1 to 3 probably resulted from eruptions of pockets of magmas differentiated to varying degrees during storage in the rift zone. Significant compositional variations between the lava erupted in the early and late parts of episodes 5 through 10 may reflect fractionation of olivine and a lesser amount of augite in a shallow magma chamber beneath Puu Oo. An overall progressive increase in CaO and MgO contents and a decrease in FeO(T), TiO_2, Na_2O, K_2O and P_2O_5 contents may be due to the combination of a progressive increase in the proportion of summit magma mixed with rift zone magma and progressive increase in the degree of partial melting of the mantle, involving an increase in the contribution of clinopyroxene to the melt.

Gases from the East-Rift showed a C/S atomic ratio of 0.17. The volatile content of the eruptive magma are estimated at: H_2O – 0.42 Wt %, S – 0.11% and CO_2 – 0.02 %.

The downrift migration of shallow earthquake swarms that occurred episodically for many months before the East-Rift eruption of January 1983 reflected the process of magma movement from summit to the rift storage complex as a preliminary stage to the eruption. Self potential (SP), controlled source electromagnetic (CSEM) and very low frequency (VLF) electromagnetic data were used to study the September 25, 1982 summit eruption as well as the first year of the Puu Oo East-Rift-Zone (ERZ) eruption. The absence of CSEM or SP changes that correlate definitely with any eruptive episodes during 1983 suggests that the path of magma transport was about 2 km deep in the upper ERZ (CSEM data) and, probably, within a conduit system that had little, if any, continuity to the surface beneath Escape Road (SP data).

Several appended maps on 1 : 50000 bring out the distribution of flows, vent deposits, measured flow thicknesses and flow progress of the long drawn out Puu Oo Eruption.

The Hawaiian Volcano observatory (HVO) of the USGS has made significant and vital contributions over the last 75 years in the understanding of Kilauean magmatic processes in particular and volcanology in general. The present professional paper carries forward the above traditions of HVO in volcanological research aided by increasingly comprehensive and sophisticated instrumentation, and an unprecedented level of logistic support by helicopters'. However, the basic motivation remains the excitement and sense of awe in dedicated recording of a dynamic geologic process like volcanism, fortunately accessible to scientific study at Hawaii.

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SILICEOUS DEPOSITS OF THE TETHYS AND PACIFIC REGIONS. J. R. Hein and J. Obradofic (Editors), Springer-Verlag, 1989, 244 pp. D.M. 120/-

The book is a collection of selected papers presented at the Third International Conference on Siliceous Deposits held in Yugoslavia, September 1986 under the International Correlation Project (IGCP) Research Group 187, 'Siliceous Deposits of the Pacific and Tethys Regions'.

The book is a collection of 14 papers divided into three parts. The first part contains two, the second part eight and the third part four papers. The first paper in part-I gives a summary of the state of the art in silica geochemistry, mineralogy, diagenesis and the pattern of silica sedimentation in Tethys and Pacific regions. An overall biogenic origin of bedded cherts in these two regions is established. The general trend in silica diagenesis is from the initial opal – A-optal-CT to micro and/or megaquartz. Chalcedony and drusy mega quartz are of porefilling origin. Silica in both Tethyan and Circumpacific regions is of pelagic and continental margin associated with deep faulted basins. Plate tectonic movements seem to have played a very important role in the origin and orientation of silica depositional basins.

Among eight papers included in part-II, five are of regional silica sedimentation and the remaining three of diagenetic (petrographic) interest.

Part III consists of four papers dealing with siliceous deposits of the Circum-Pacific belt. The first two papers (11 and 12 listed in the book) deal with general silica depositional environment, the last two again on silica diagenesis.