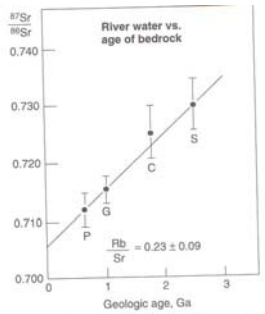

FIGURE 18.2 Average $^{87}Sr/^{86}Sr$ ratios of Canadian rivers draining tectonic provinces of different ages: S = Superior; C = Churchill; G = Grenville; P = Paleozoic. The error bars are two standard deviations of the mean, as indicated in Table 18.1. Data from Wadleigh et al. (1985).

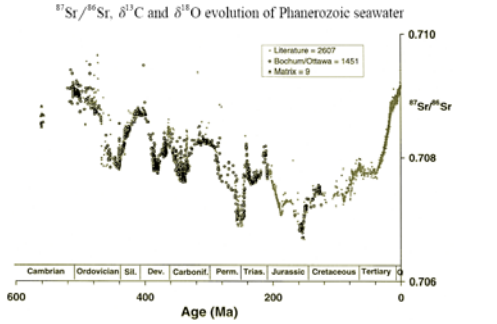

Fig. 4. $^{87}Sr/^{86}Sr$ variations for the Phanerozoic based on 4055 samples of brachiopods ('secondary' layer only for the new Bochum/Ottawa measurements), belemnites and conodonts, and nine samples of micritic matrix. Normalized to NBS 987 of 0.710240. The literature data (foraminifera, belemnites and conodonts) are from the following sources: Peterman et al. (1970), Dash and Biscaye (1971), Veizer and Compston (1974), Brass (1976), DePaolo and Ingram (1985), Koepnick et al. (1985), Hess et al. (1986, 1989), Popp et al. (1986c), McKenzie et al. (1988, 1993), Hodell et al. (1989, 1990, 1991), Brand (1991), Martin and McDougall (1991, 1995), Bertram et al. (1992), Du et al. (1992), Barrera et al. (1993), Kürschner et al. (1993), Whittaker and Kyser (1993), Banner and Kaufman (1994), Cummins and Elderfield (1994), Denison et al. (1994), Hodell and Woodruff (1994), McArthur et al. (1994), Oslick et al. (1994), Quinn et al. (1994), Jones et al. (1994a,b), Chaus and Schmalz (1995), Farrell et al. (1995), Ruppel et al. (1996), Wenzel (1997), Qing et al. (1998).

Chemical Geology 161 (1999) 59–88

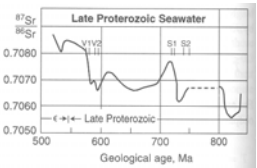

FIGURE 19.8 Variation of the $^{87}Sr/^{86}Sr$ ratio of seawater during the Late Proterozoic (Neoproterozoic) Era. The curve was drawn free-hand to include the lowest values of the $^{87}Sr/^{86}Sr$ ratios. V1, V2 = Varangian glaciation; S1, S2 = Sturtian glaciation both of which were global in scope and caused the Snowball Earth phenomenon. Adapted from Jacobsen and Kaufman (1999) and based on data compiled by them from Derry et al. (1989, 1992, 1994), Asmerom et al. (1991), and Kaufman et al. (1993, 1996) for carbonate rocks from Siberia, Namibia, Svalbard, and Canada.

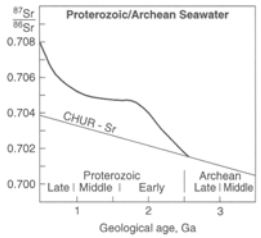

FIGURE 19.9 Isotope composition of Sr in seawater during the Archean and Proterozoic Eons. The $^{87}Sr/^{86}Sr$ ratios of marine carbonate rocks of Archean age are similar to those of mantle Sr represented by CHUR-Sr. The curve was adapted from Ray et al. (2002) and Shields and Veizer (2001).

Sr chronology

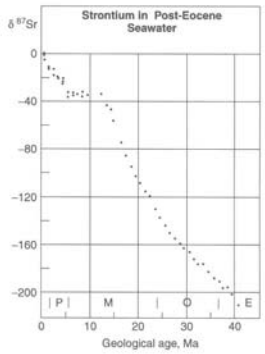

FIGURE 19.4 Isotope composition of Sr in post-Eocene seawater expressed as $\delta^{87}Sr$, which is defined by equation 19.10. The $\delta^{87}Sr$ parameter is calculated from the difference between the $^{87}Sr/^{86}Sr$ ratios of marine carbonate samples and seawater when both are measured on the same mass spectrometer. The samples are shells of planktonic foraminifera taken from several different Deep Sea Drilling Program (DSDP) cores. Data from Hess et al. (1986, 1989) and Hodell et al. (1989, 1990).

Late Cenozoic uplift of mountain ranges and global climate change: chicken or egg?

Peter Molnar & Philip England

NATURE · VOL 346 · 5 JULY 1990

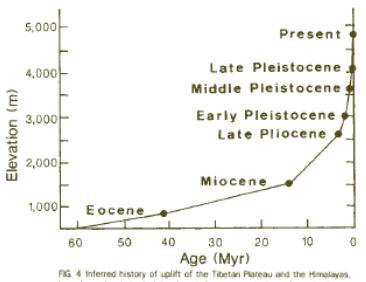

FIG. 4 Inferred history of uplift of the Tibetan Plateau and the Himalayas, based on palaeobotanical data largely from the north slope of the Himalayas. (Redrawn from ref. 60.) Fossil species whose nearest living relatives grow at relatively low elevations and in relatively warm climates were used to infer lower past elevations, but no account was taken of global cooling, as illustrated in Fig. 1. We show this as an example of inferred uplift, but we doubt that it is precise, or that it applies to all of the Tibetan plateau.

$^{87}Sr/^{86}Sr$, $\delta^{13}C$ and $\delta^{18}O$ evolution of Phanerozoic seawater

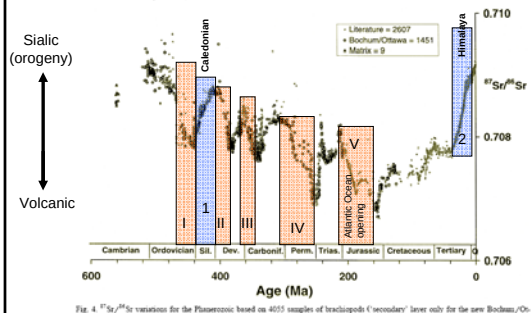

Fig. 4. $^{87}Sr/^{86}Sr$ variations for the Phanerozoic based on 4055 samples of brachiopods ('secondary' layer only for the new Bochum/Ottawa measurements), belemnites and conodonts, and nine samples of micritic matrix. Normalized to NBS 987 of 0.710240. The literature data (foraminifera, belemnites and conodonts) are from the following sources: Peterman et al. (1970), Desh and Biscaye (1971), Veizer and Compston (1974), Reuss (1976), DePaolo and Ingram (1985), Koepnick et al. (1985), Hess et al. (1986, 1989), Popp et al. (1986c), McKenzie et al. (1988, 1993), Hodell et al. (1989, 1990, 1991), Brand (1991), Martin and McDougall (1995, 1995), Bertram et al. (1992), Dia et al. (1992), Barrera et al. (1993), Kürschner et al. (1993), Whittaker and Kyser (1993), Banner and Kaufman (1994), Cummins and Elderfield (1994), Denison et al. (1994), Hodell and Woodruff (1994), McArthur et al. (1994), Oslick et al. (1994), Quinn et al. (1994), Jones et al. (1994a,b), Chaus and Schmatz (1995), Farrell et al. (1995), Ruppel et al. (1996), Wenzel (1997), Qing et al. (1998).

Chemical Geology 161 (1999) 59–88