Our solutions CAP09 and CAP10 have rotation rates of 0.598 ± 0.009 and 0.569 ± 0.005 °/Myr, respectively. Both rates are close to the value of 0.59 ± 0.014 °/Myr reported by Angermann et al. (1999). Given this close agreement, we adopt the CAP10 rate for the present and compare it with average rates obtained from various stage poles to infer how the angular velocity of the Nazca–SoAm Euler vector has changed during the past ~20 Ma (Fig. 3). Estimating a deceleration in this way involves a familiar problem: If we estimate a rate over a shorter period of time (say, 10.8 Myrs), we are less likely to run into difficulties when we assume a constant rate of deceleration. However, by estimating a rate over a longer period of time (say, 20 Myrs) and incorporating additional measurements, we might better mitigate the impact of individual measurement errors. Because of the absence of error bars on many of the points in Fig. 3, we believe it would be premature to try to infer how the deceleration rate may have changed during the past 20 Myrs. We prefer to conclude simply that during the past 10–20 Myrs, the rate of rotation of the Nazca–SoAm Euler vector has declined or decelerated by between 0.04 and 0.06 °/Myr². We also conclude that the rotation rate difference between NUVEL-1A (i.e. 0.72 ± 0.02 °/Myr) and the three nearly identical geodetic estimates (CAP09, CAP10, and Angermann et al., 1999) is not easily explained by uniform deceleration of Nazca–SoAm plate convergence (Fig. 3).

5. Discussion

Each new estimate of the current Nazca–SoAm Euler pole seems more tightly constrained than prior estimates by virtue of a steadily expanding data set. At this point, the major uncertainty is whether the GPS station at EISL is moving relative to the stable core of the Nazca plate. We believe it probably is, and for this reason, we prefer CAP10 to CAP09. We have no observational basis for deciding whether this anomalous motion is due to ground or monument instability, volcanic deformation, or regional intraplate deformation, though we suspect that regional deformation is the major problem.

The various geodetic estimates for the Nazca–SoAm Euler vector imply quite different subduction rates over the plate boundary as a whole (Table 4 and Fig. 4). Resolving these discrepancies has important implications for seismic risk along the Andes, as well for groups modeling interseismic strain accumulation (e.g. Bevis et al., 2001; Trenkamp et al., 2002).