ITRF94 RESULTS

The ITRF94 sets of coordinates at epoch 1993.0 are split into four tables according to their classes. They are available in Tables T5, T6, T7 and T8 of the appendix. Velocities are available for all stations of class A as well as for most of stations of classes B and C. These velocities have to be used to refer the ITRF94 coordinates from 1993.0 epoch to another desired epoch.

Table T9 contains the transformation parameters adjusted at epoch 1993.0 as well as the rates of class I solutions. The rates have to be considered as annual variations to the transformation parameters. So for a given transformation parameter T at an epoch t in years, we have:

$$T(t) = T(t_0) + \dot{T} \cdot (t - t_0), \text{ with } t_0 = 1993.0 \qquad (2)$$

CONSISTENCY OF EOP WITH TERRESTRIAL AND CELESTIAL REFERENCE FRAMES

Let us consider two series of EOP, each of which is referred to a celestial frame defined by the adopted Radio Source Coordinates (RSC) and to a terrestrial frame defined by the adopted Set of Station Coordinates (SSC). The systematic differences in the pole coordinates (Δx, Δy), in universal time ($\Delta UT1$), and in the celestial pole offsets ($\Delta d\psi$, $\Delta d\varepsilon$) due to the rotations (A_1, A_2, A_3) between the two celestial frames and (R_1, R_2, R_3) between the two terrestrial frames are given by the relationships (Zhu and Mueller, 1983) :

$$\begin{aligned} \Delta x &= R_2 - A_1 \sin\theta + A_2 \cos\theta \\ \Delta y &= R_1 + A_1 \cos\theta + A_2 \sin\theta \\ f.\Delta UT1 &= -R_3 + A_3 \\ \Delta d\psi &= A_2/\sin\varepsilon \\ \Delta d\varepsilon &= -A_1 \end{aligned} \qquad (3)$$

where θ is the sidereal time, f is the conversion factor from universal time to sidereal time, and ε is the obliquity of the ecliptic. The dependence of Δx, Δy on the celestial frames angles A_1, A_2 are diurnal terms which are not accessible to the present analysis. The relationships (3), applied to the comparison of the data sets described in Table II-1 of the 1994 IERS Annual Report, p. II-14, with EOP(IERS) C 01 on the one hand, and the comparisons of the related reference frames to RSC/SSC(IERS) 95 C 01 on the other hand can be used to characterize the internal consistency of the set of IERS results, time series and reference frames.

When considering two terrestrial frames, each one having its own velocity field, and the corresponding series of EOP, the relative drifts $\Delta x'$, $\Delta y'$, $\Delta UT1'$ between the series of EOP can be predicted by relationships (3), obtained as the time derivatives for the first three relationships (3):

$$\Delta x' = R'_2 \ ; \ \Delta y' = R'_1 \ ; \ \Delta UT1' = -R'_3 \qquad (4)$$

where R'_1, R'_2, R'_3 are the rates of change of the rotation angles between the two terrestrial reference frames. These relationships are used to compare the drifts of the EOP series relative to EOP(IERS) C 01 are compared with their predicted values derived from the rates of change of their rotation angles relative to the ITRF94 velocity field.

Table T11 (a) and (b) gives the evaluations of internal consistency for the Class I individual terrestrial frames using relationships (3) and (4) (see also Figures 2 and 3). The celestial frames angles are those in Table C-2, p. II-26 of the 1994 IERS Annual Report. The terrestrial frames angles and their rates of change with time come from Table T9. The closures for x, y, UT1-UTC at 1993.0 and of their rates of change are plotted on Figures 1 and 2 respectively. Based on these closures for the earth-rotation series used to derive EOP(IERS) C 01 in 1984-1994, an estimation of the inconsistency of EOP(IERS) with the IERS reference frames is given in Table 7 and plotted on Figures 1 and 2.

Table 7. Consistency of the IERS eop series with the IERS reference frames:
the value to add to EOP(IERS) time series in order to make them consistent with the 1994 realizations of the IERS terrestrial and celestial reference systems is A+A' (t-1993.0), t in Besselian years.

Cor	x 0.001"	y 0.001"	UT1 0.0001s	$d\psi$ 0.001"	$d\varepsilon$ 0.001"
A	-0.05 ±0.28	+0.76 ±0.29	-0.42 ±0.16	-0.01 ±0.07	0.00 ±0.03
A'	+0.12 ±0.07	+0.11 ±0.07	0.04 ±0.05	-	-

For Class II individual terrestrial frames, comparisons based on equations (3) are given in Table T11 (c), for the epochs of the terrestrial frames (cf Table T10).

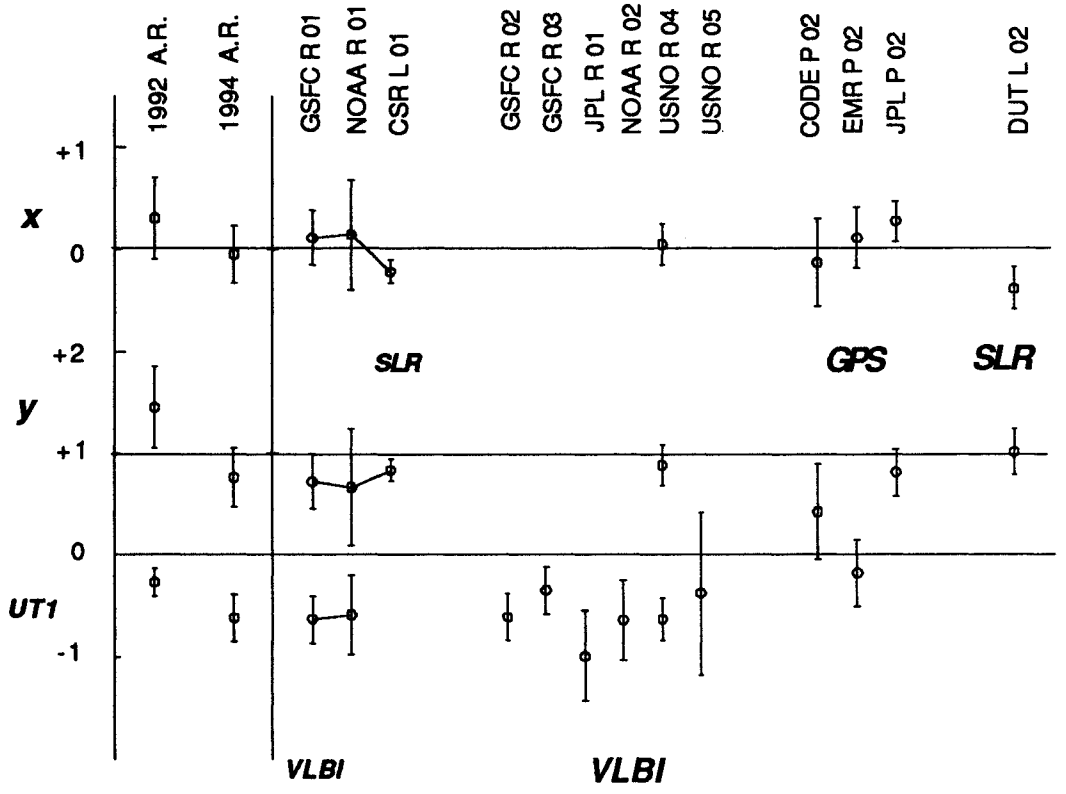

Figure 2. Consistency of biases in EOP at 1993.0 with the orientation of reference frames, both relative to the IERS results. The global estimations derived from the 1992 and 1994 Annual Report analyses are plotted on the left. Unit: 0.001".

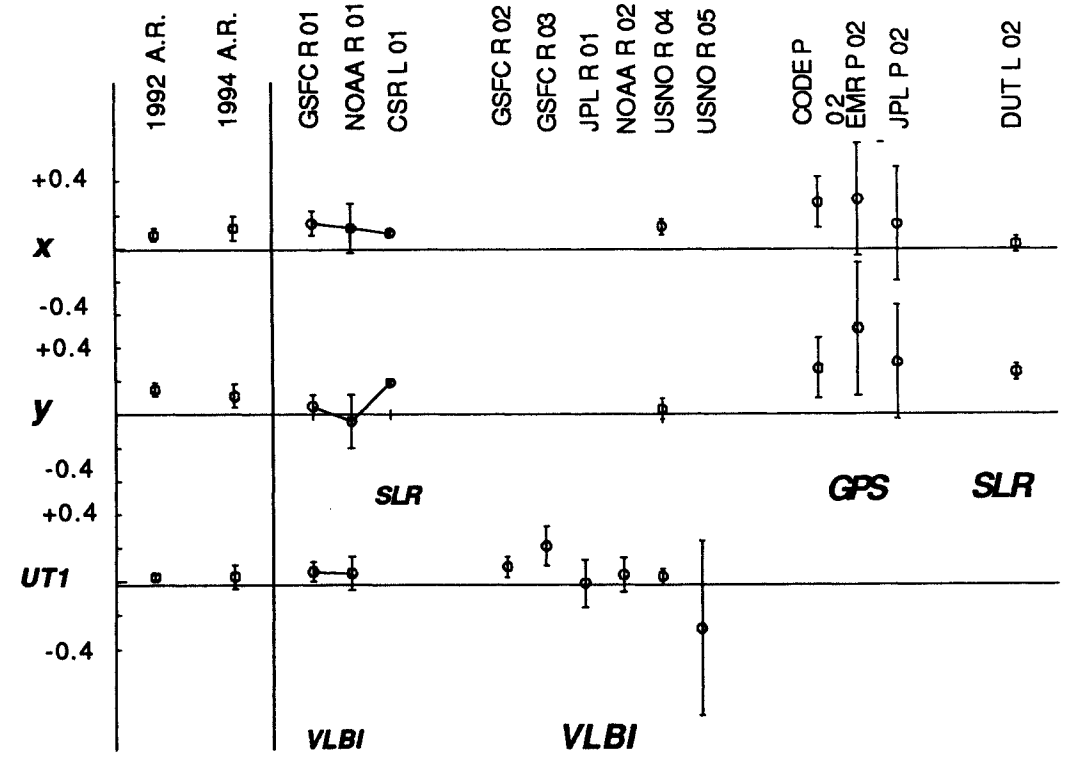

Figure 3. Consistency of the drifts in EOP with the rotation rate of terrestrial frames, both relative to the IERS results. The global estimations derived from the 1992 and 1994 Annual Report analyses are plotted on the left. Unit: 0.001"/year.