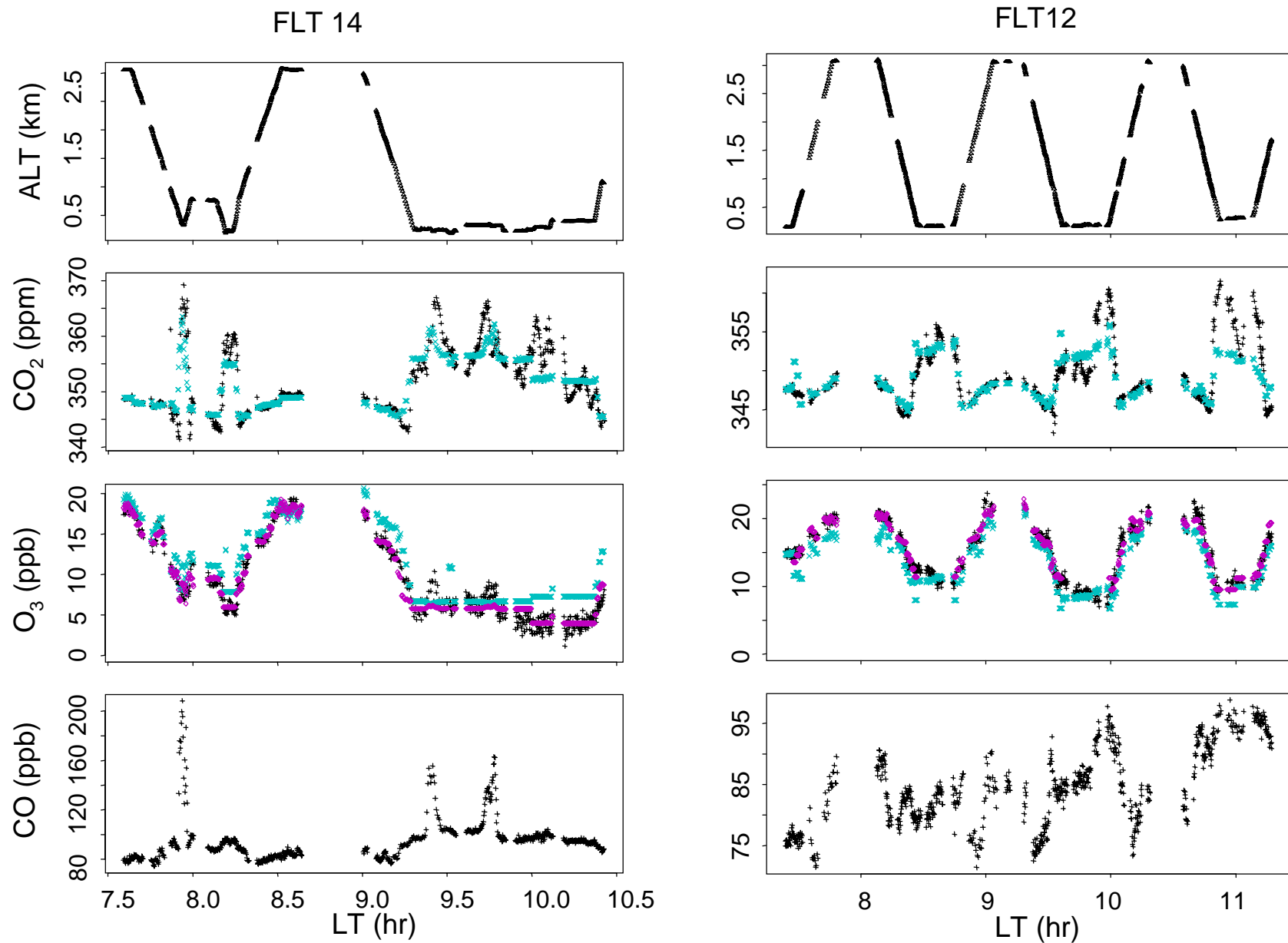
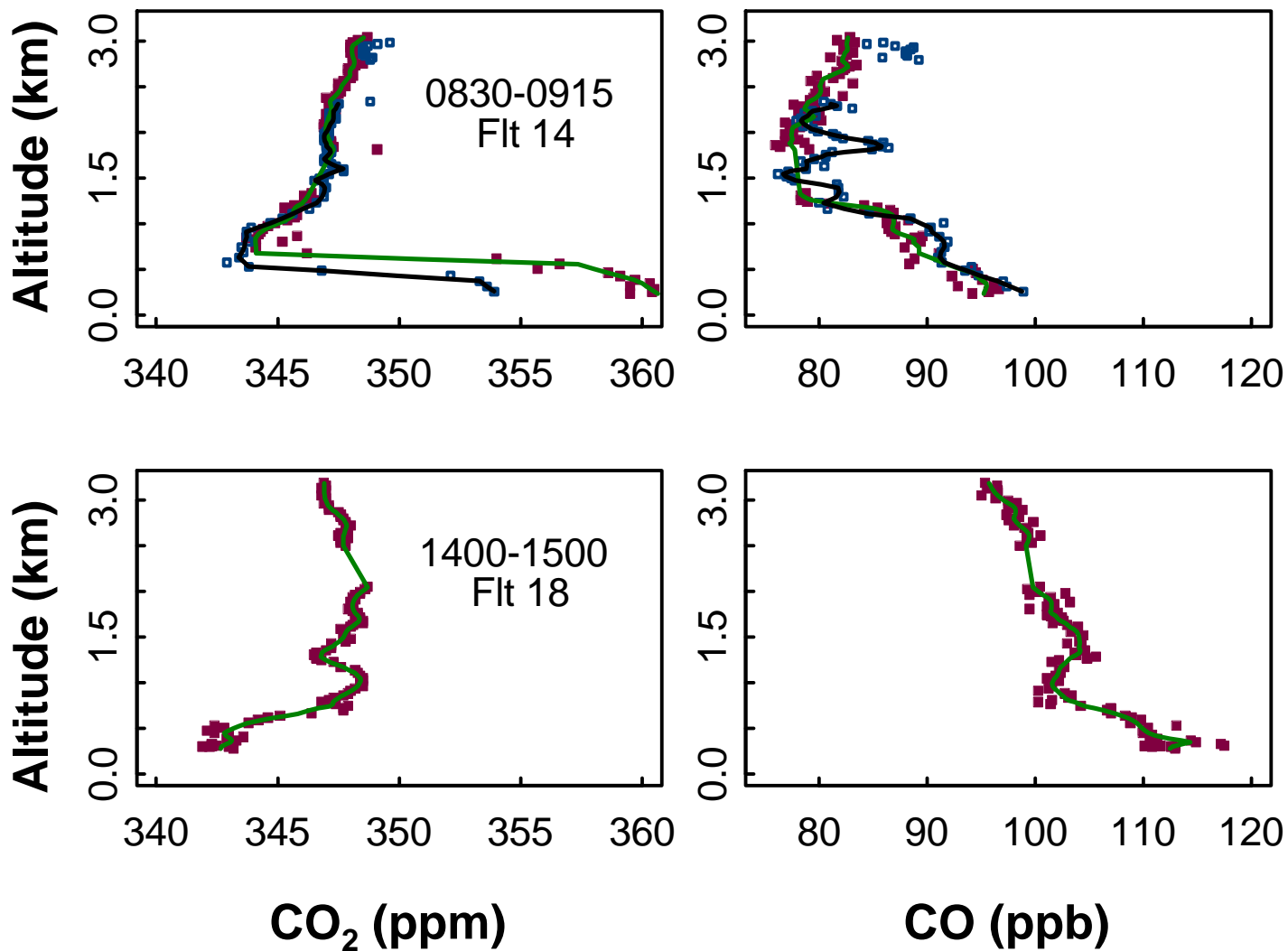


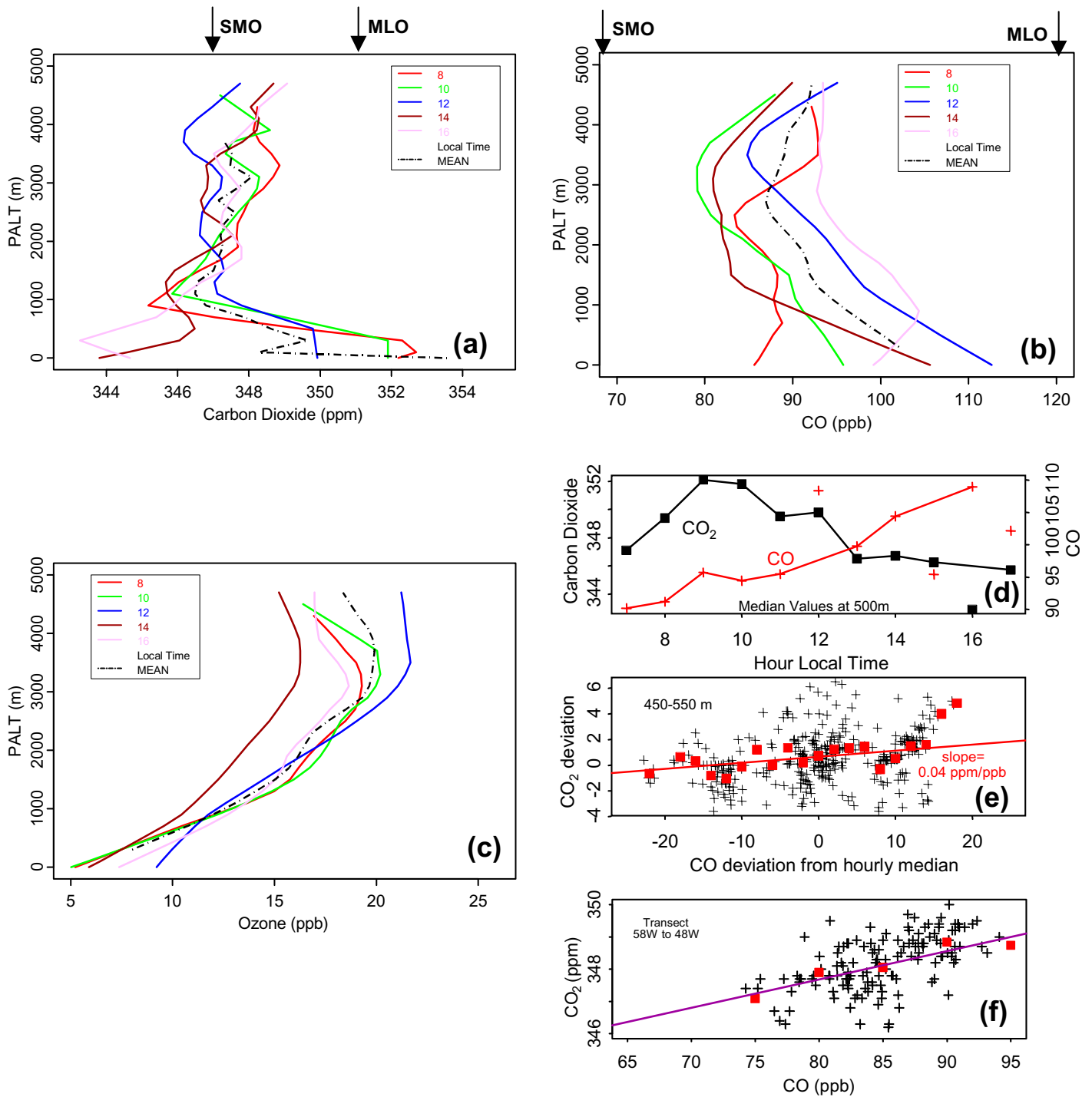
**Figure 1.** Map showing locations (+) for the 85 vertical profiles acquired during ABLE-2B, 15 April – 8 May 1987. The wind in the lower 3 km of the atmosphere averaged  $6.4 \text{ m s}^{-1}$  from the East (arrow), giving a transit time of 4.3 days to the main sampling area northeast of Manaus, 2400 km from the ocean. (*inset*) Diurnal variation of the mean column concentration of  $\text{CO}_2$  (0.2-2.8 km) in central Amazonia (+, west of  $-56^\circ$ ) compared to values in eastern Amazonia (o, east of  $-56^\circ$ )



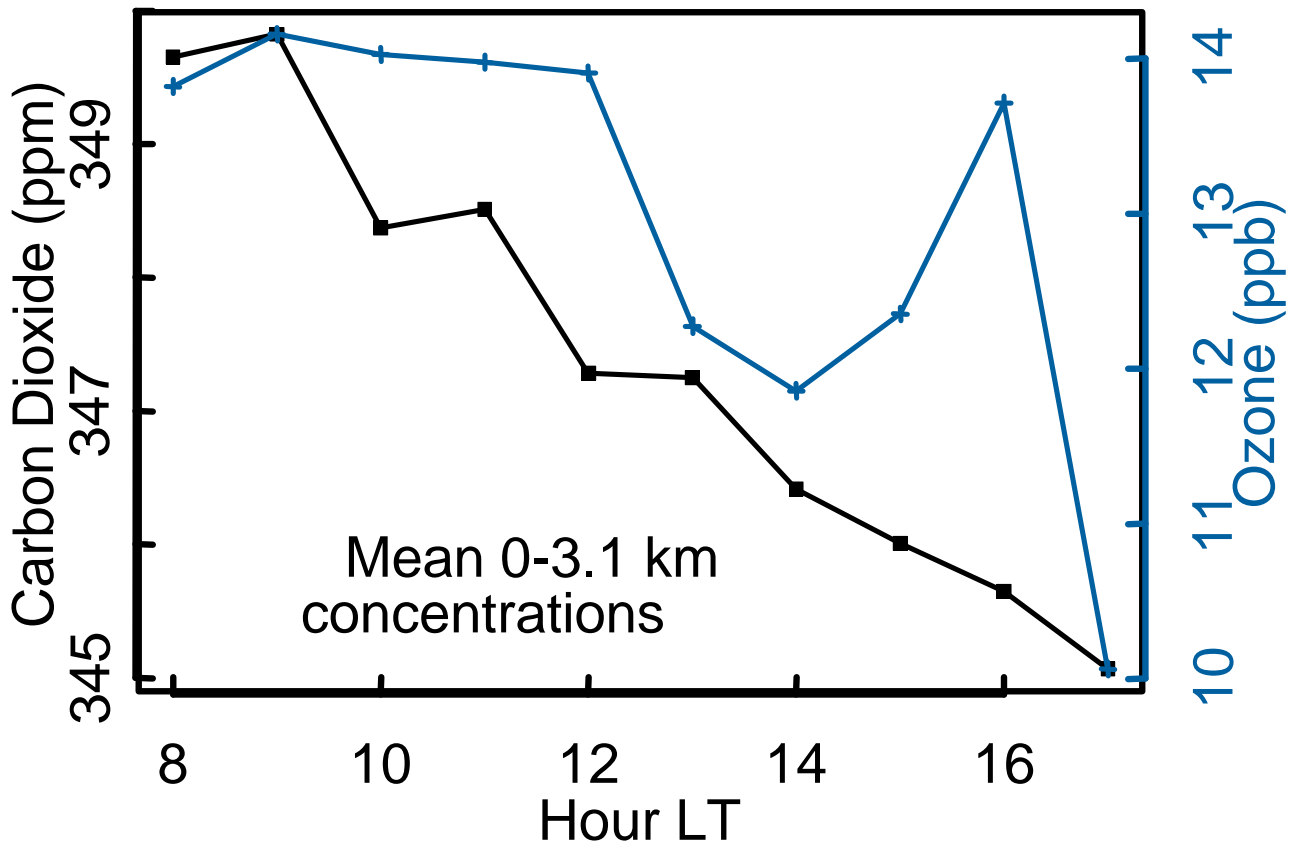
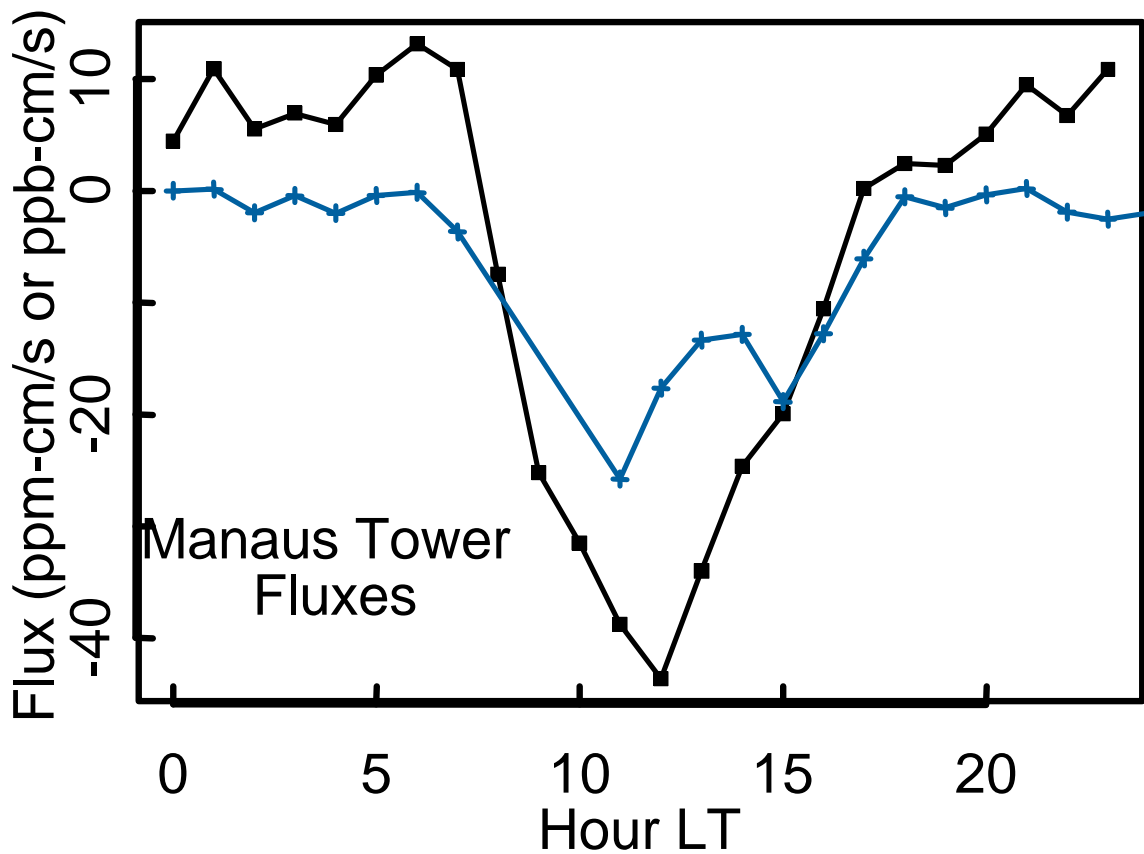
**Figure 2a.** Data for altitude, CO<sub>2</sub>, O<sub>3</sub>, and CO are plotted vs. time for flights 12 and 14 (see Table 1). Black points show the observations for 10s intervals with valid data for CO<sub>2</sub>. Blue points show linear model representation of the data using CO as a predictor with hour and altitude as factors. Red points for O<sub>3</sub> add date as a factor to account for variation of background O<sub>3</sub> concentrations. Smoke layers encountered on flight 14 (8, 9.5, 9.7 hr) contributed up to 15 ppm CO<sub>2</sub>.



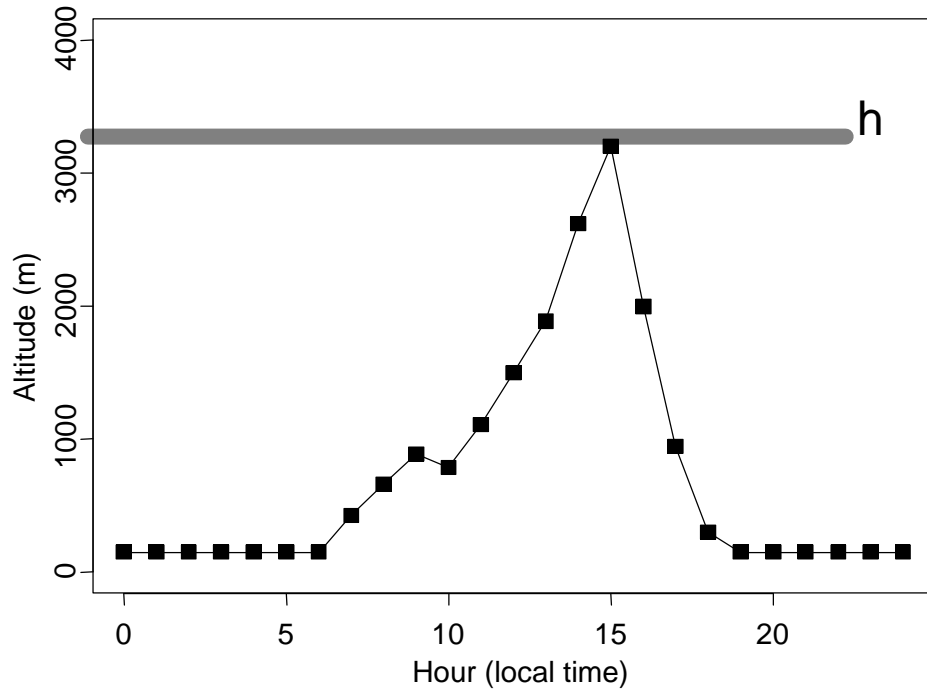
**Figure 2b.** Vertical profile data (points) for CO<sub>2</sub> and CO for flight 14 (*upper*) and flight 18 (*lower*), and smoothed curves from locally-weighted least-squares (lines). Note close agreement of two profiles (30 minutes apart, filled=earlier) above the PBL for both CO<sub>2</sub> and CO in Flt. 14. Data gaps show locations of mid-profile calibrations.



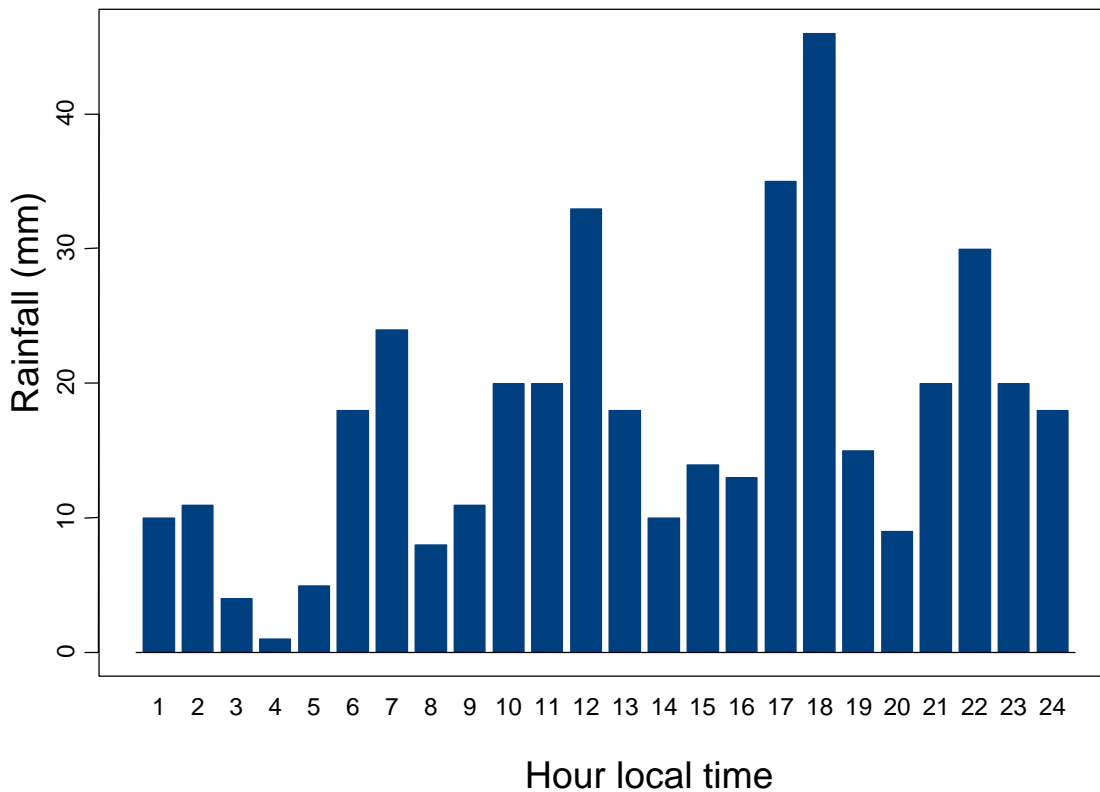
**Figure 3 . (a)** Vertical profiles for CO<sub>2</sub> from 15 flights, days 105-126, 1987 in central Amazonia (Table 1), block averaged by local time. **(b)** Vertical profiles for CO, as in (a). Arrows show data from mid-Pacific stations Samoa (SMO, 14° 15' S, 170° 34' W) and Mauna Loa (MLO, 19° 32' N 155° 35' W) for April, 1987 (CO<sub>2</sub>) and for April, 1990 (the first year of station data for CO). **(c)** Vertical profiles for O<sub>3</sub>, as in (a). **(d)** Diurnal variation of CO<sub>2</sub> and CO concentrations at 500m (median values for each hour, all flights). Lines illustrate the general trends during the day. **(e)** Deviations of CO<sub>2</sub> and CO from the hourly median concentrations (*panel d*) at 500±50m. **(f)** CO and CO<sub>2</sub> gradients across the Amazon Basin (Santarem-Manaus survey) at 3 km altitude: +, raw, ■, block averaged by CO (1 ppb bins, *panel e*; 5 ppb bins, *panel f*), — linear regression line; — straight-line connecting SMO and MLO data points (slope=0.08 ppm/ppb).



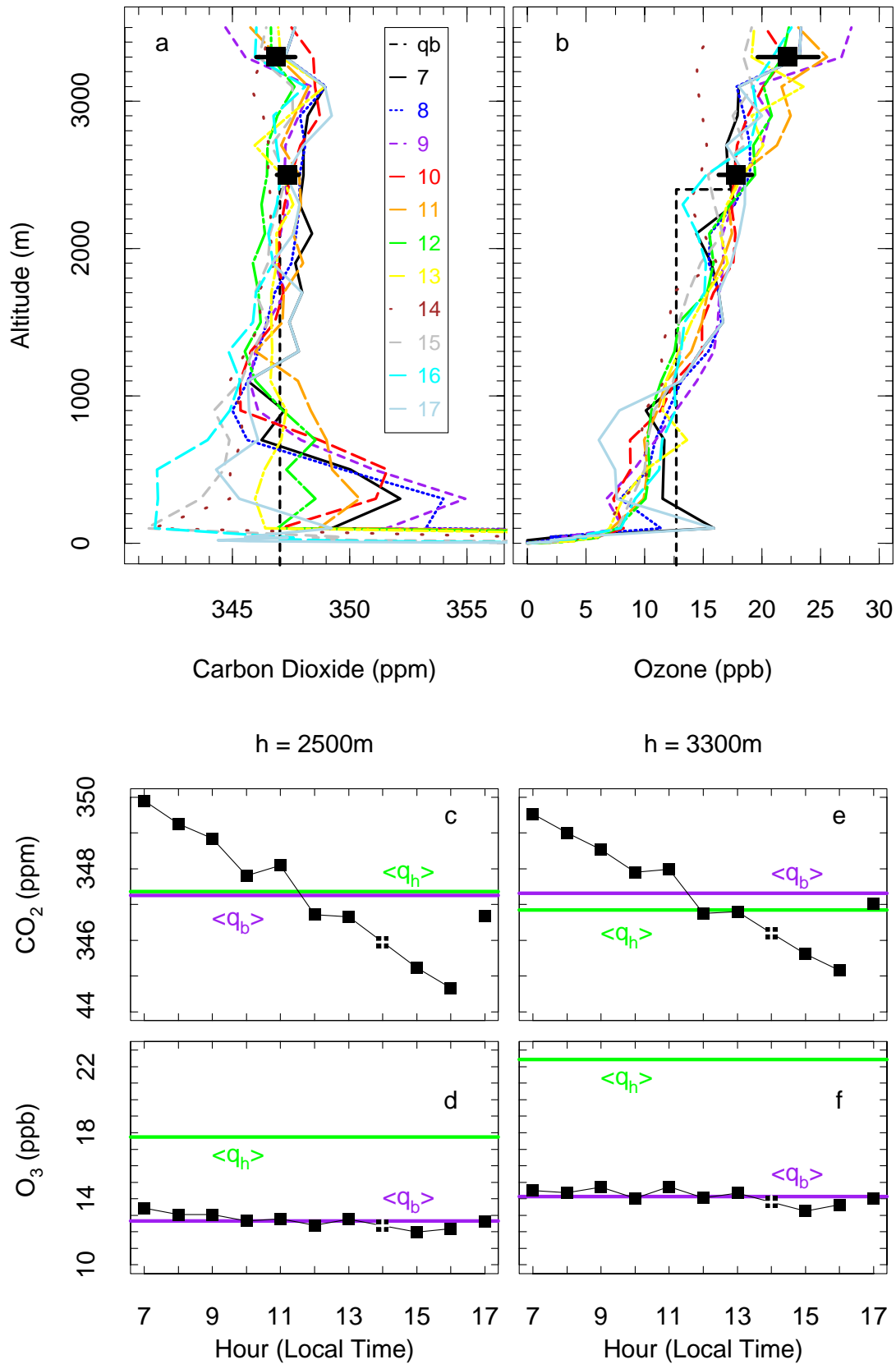
**Figure 3g.** (upper) Fluxes of CO<sub>2</sub> (**black**) and O<sub>3</sub> (**blue**) vs. local time at the Manaus tower [Fan et al., 1990]. (lower) Density weighted mean concentrations during the day for the column 0 – 3.1 km from the aircraft.



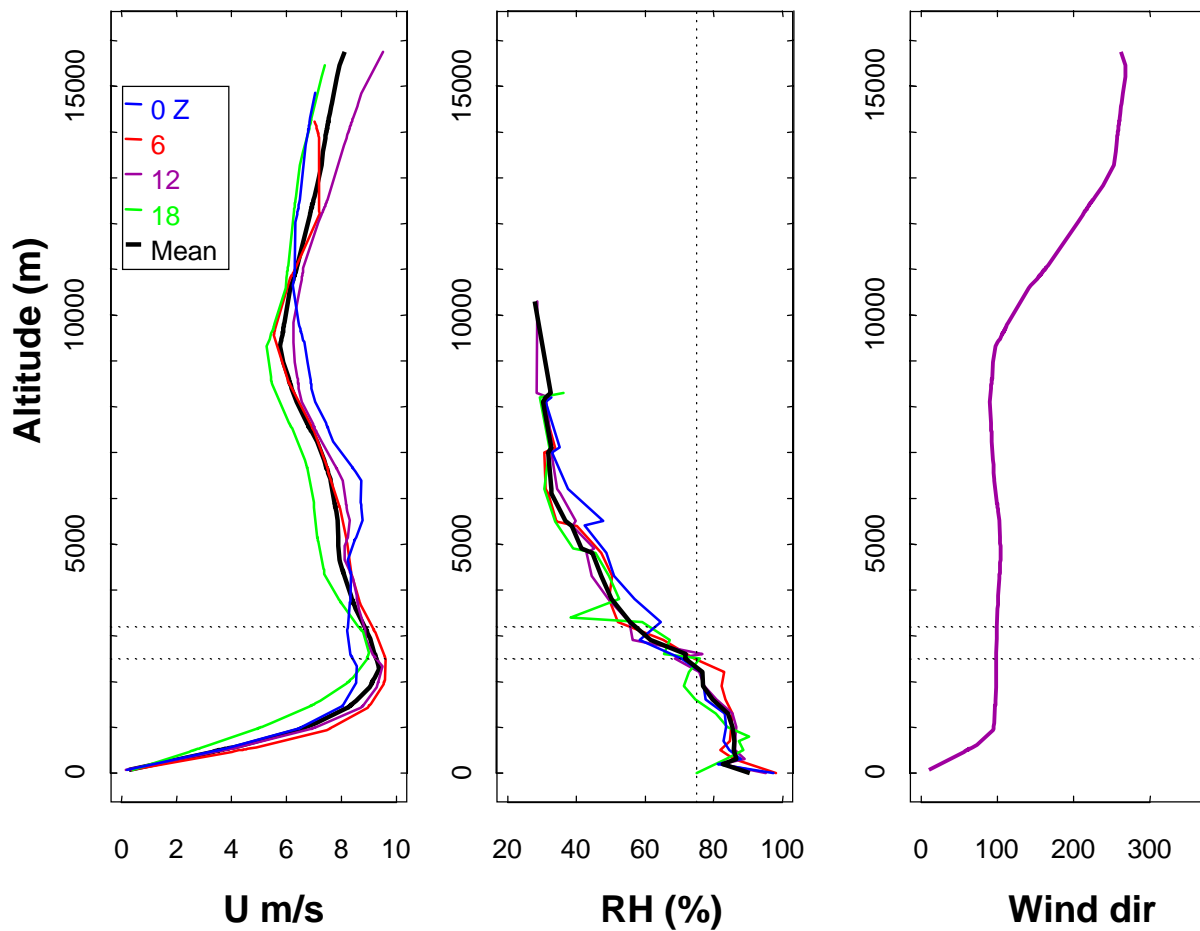
**Fig. 4a.** Mean diurnal variation of the height influenced by exchange with the surface (■) inferred from aircraft profiles of CO<sub>2</sub>, O<sub>3</sub>, H<sub>2</sub>O, and temperature. The height  $h$  in Eq. 1 is indicated by the grey horizontal line.



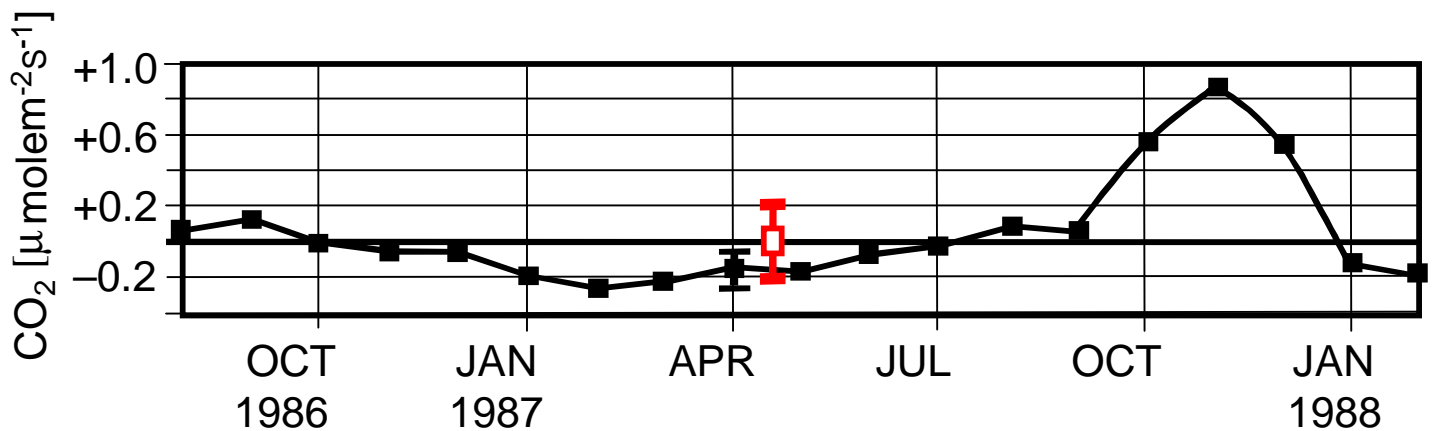
**Fig. 4b.** Mean hourly rainfall from a basin-wide network of automated weather stations [from *Greco et al.*, 1990].



**Figure 5.** Concentrations for CO<sub>2</sub> and O<sub>3</sub> from Model 1, with CO set to 84 ppb and tower data appended at the bottom: **(a), (b)** mean hourly profiles for CO<sub>2</sub> and O<sub>3</sub>, respectively; **■**, daily mean at h=2.5 and 3.3 km, vertical dashed line,  $q_b$ ; **(c), (d)** for h=2.5 km: **■**, hourly column-means for CO<sub>2</sub> and O<sub>3</sub>; ( $q_b$ ), daily averages for 0-h; ( $q_h$ ), at h; **(e), (f)** same as (c),(d), for h=3.3 km. Hour=14 was interpolated and hour 17 was excluded from the computation of regional flux.



**Figure 6.** Wind speed ( $\text{m s}^{-1}$ ), relative humidity (%), and wind direction (degrees) at EMBRAPA (60 W, 2.5 S): Averages of four soundings per day (0, 6, 12, 18 GMT, or 20, 2, 8, and 14 local) obtained daily during the experiment [Cohen et al., 1995]; dotted lines show  $h = 2500$  and  $3300\text{m}$ . The sounding data for 5 sites may be retrieved from <ftp://ftp-gte.larc.nasa.gov/pub/ABLE2B/GROUND/NOBRE.INPE/>.



**Figure 7.** Ecosystem flux for April-May, 1987, computed by the IBIS model [■] for the study area (58-60 W, 1-3 S), compared to the regional flux results from ABLE2B [□] (IBIS results courtesy A. Botta and J. Foley, *private communication*, 2001). Note the ENSO-induced release of carbon in Oct.-Dec. 1987, with strong uptake in the previous wet season (Jan.-May).