

1 **Meteorological observations in the northern Chilean coast**
2 **during VOCALS-REx - SUPPLEMENTARY MATERIAL**

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11 **SUPPLEMENT**

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14 **SURFACE OBSERVATIONS AT PAPOSO DURING VOCALS-REx**

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16 **Air Temperature**

17 Sensors: Vaisala HMP 45C (PA) and HMP 45AC (PB). Error < 0.3 °C in the 0-40 °C range.

18 **Data description:**

19 Figure A1 illustrates time series (5-min averages) measured at PA (red) and PB (blue). Mean
20 diurnal cycles show larger amplitudes at PA (~3⁰C) as compared with PB (~1.5⁰C). Mean
21 values are 15.2⁰C and 9.8⁰C at PB and PA, respectively. A phase shift of 1.5 hours is
22 observed in the time of the mean maximum, PA lagging PB. Individual diurnal cycles show
23 proportional larger variability at PA than in PB, the former reflecting variability in the height
24 of the inversion base.

25 The positive tendency in the times series shows a steady transition from austral spring to
26 summer. Between November 6-8, large amplitudes of the diurnal cycle at PA and PB coincide
with high insolation (Fig. A2b).

1 Solar radiation

2 Sensors: Apogee PYR-P (CS300), Absolute accuracy \pm 5% for total daily radiation

3 Data description:

4 Figure S2 shows a) time series (5-minute averages) at PA (red) and PB (blue); b) Integrated
5 solar radiation over each day (daily insolation). Mean diurnal cycles of hourly solar radiation
6 and individual daily cycles (thin gray lines) are represented in Fig. S2c

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8 Relative humidity (RH) and water vapor mixing ratio (w)

9 Sensors: Vaisala HMP 45C (PA) and HMP 45AC (PB). Accuracy at 20 °C: \leq \pm 3% RH

10 Data description:

11 Figures S3a and S3b illustrate time series of RH and w (5-minute averages), respectively.
12 Mean and individual diurnal cycles of hourly values of these variables are presented in Figs.
13 S3c-f. Fairly small amplitude in the mean RH at PB (75-80%), contrasting with PA where
14 the mean RH ranges from 85 to 100 %. As expected, in both stations the mean RH cycles
15 closely follow the mean T ones (Fig. S1b, c). Maximum w in the mean diurnal cycles are 8.5
16 g kg⁻¹ and 8.0 g kg⁻¹, observed at 18:00 LT and 17:00 LT at PB and PA, respectively.

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18 Atmospheric pressure

19 Sensors: Vaisala PTB101B (CS105). Total accuracy \pm 0.5 hPa at 20 °C.

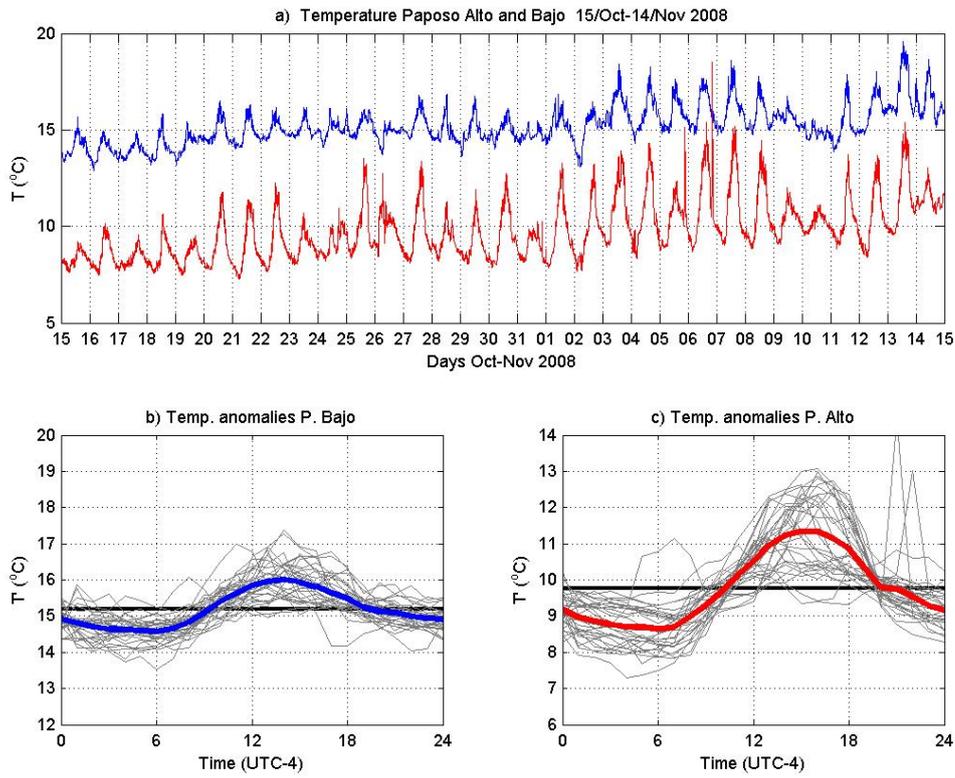
20 Data description:

21 Time series of hourly values at PB (blue), PA (+ 81 hPa: red) and CC (green) are depicted in
22 Fig. S4. Immersed in the characteristic semi-diurnal cycles, pressures steadily decrease from
23 the 7th to the 12th, period when strong ridging and warming in the middle troposphere was
24 observed at Paposo (Fig. 5a).

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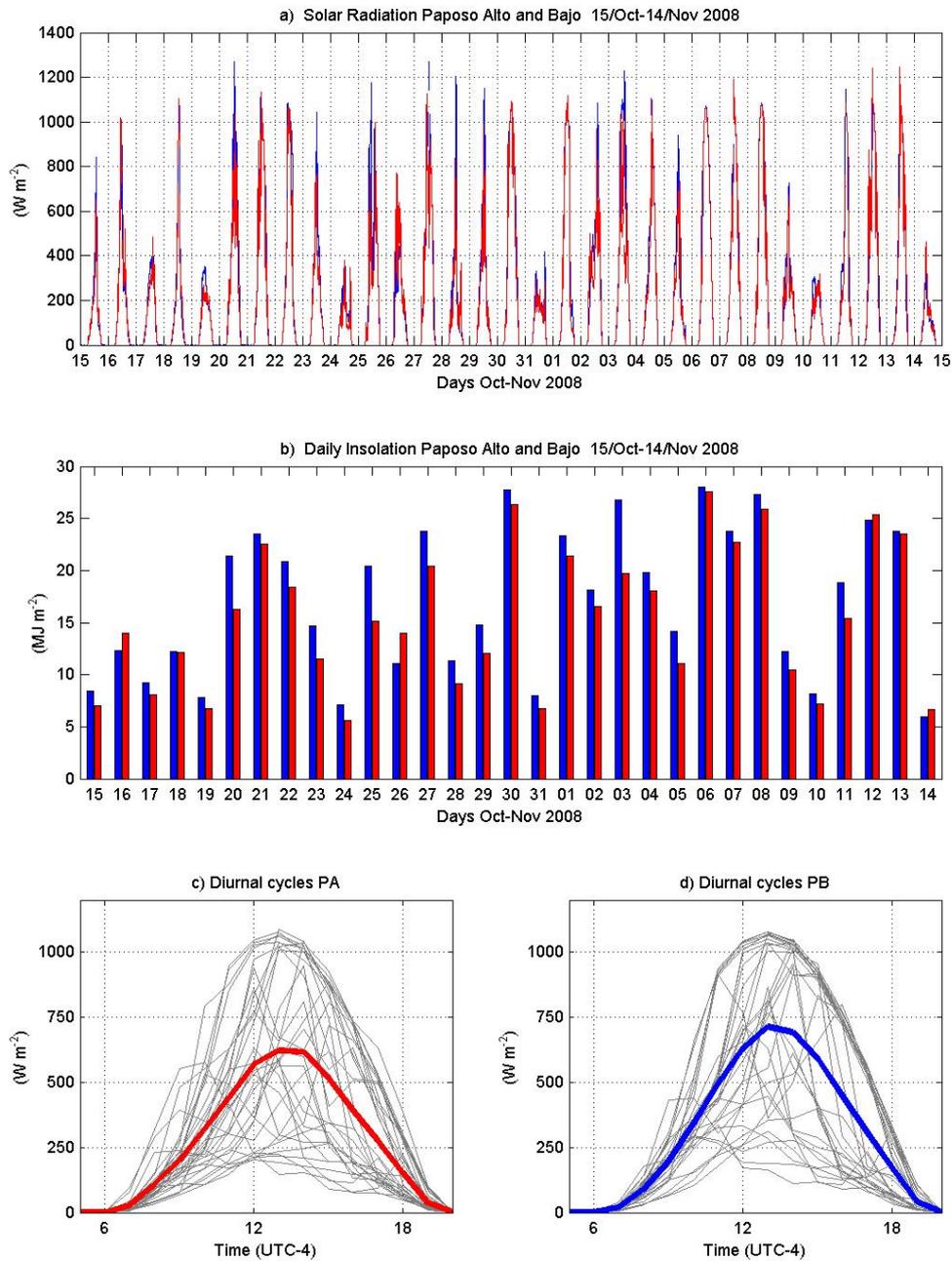


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3 FIGURE S1 a) Time series of temperature (5-minute averages) measured at PA (red) and PB
4 (blue). b) Mean diurnal cycle (blue line) of hourly temperature anomalies at PB. c) Mean
5 diurnal cycle (red line) of hourly temperature anomalies at PA. Thin gray lines in b) and c)
6 show daily series. Anomalies are computed with respect to daily averages. Thick black lines
7 in b) and c) mark the average of each station in the full period.

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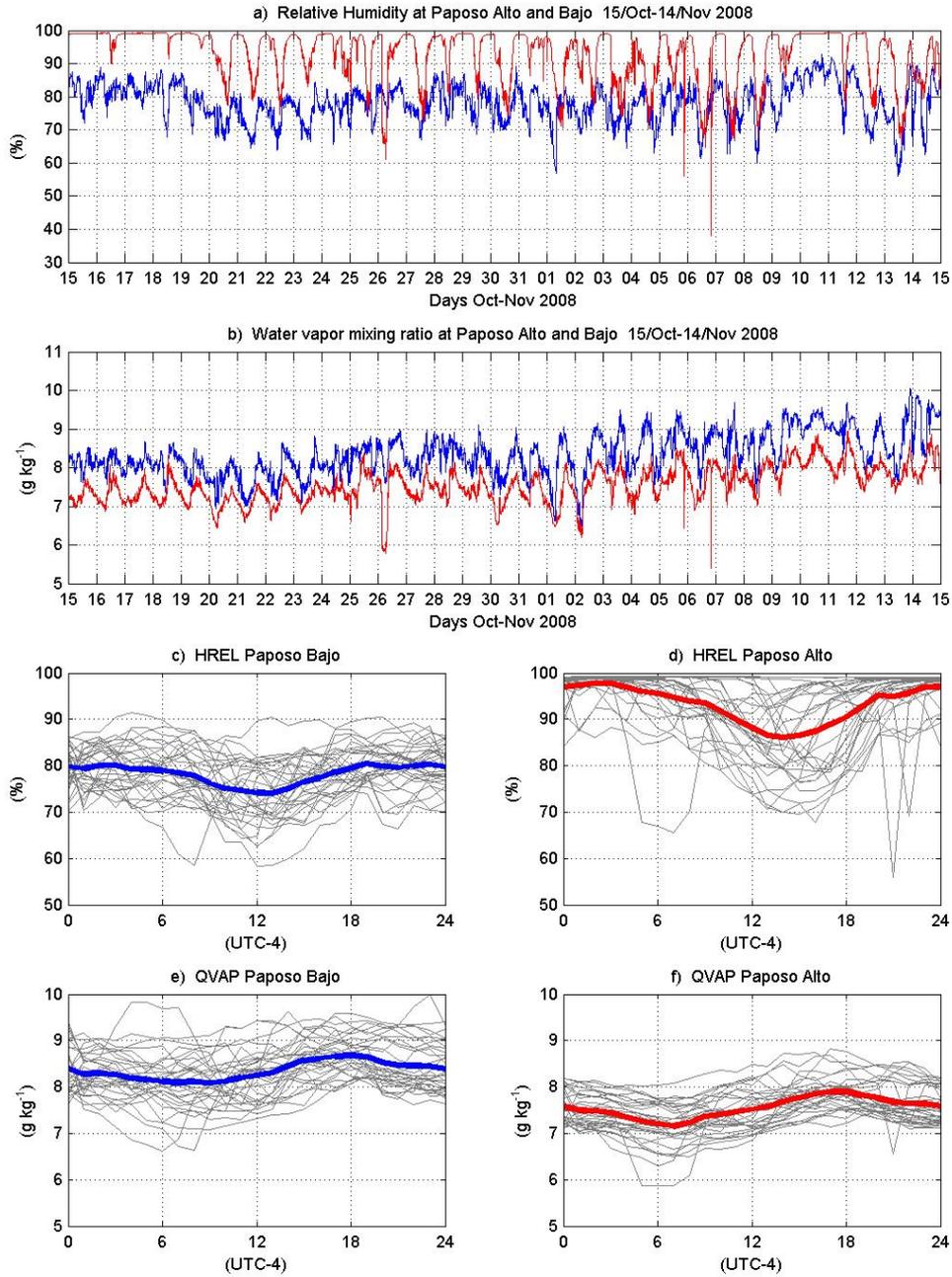


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3 FIGURE S2 a) Time series of solar radiation (5-minute averages) measured at PA (red) and
 4 PB (blue). b) as a) but for daily insolation. c) Mean diurnal cycles of hourly solar radiation at
 5 PA. Thin gray lines show daily series. d) As c) but for PB.

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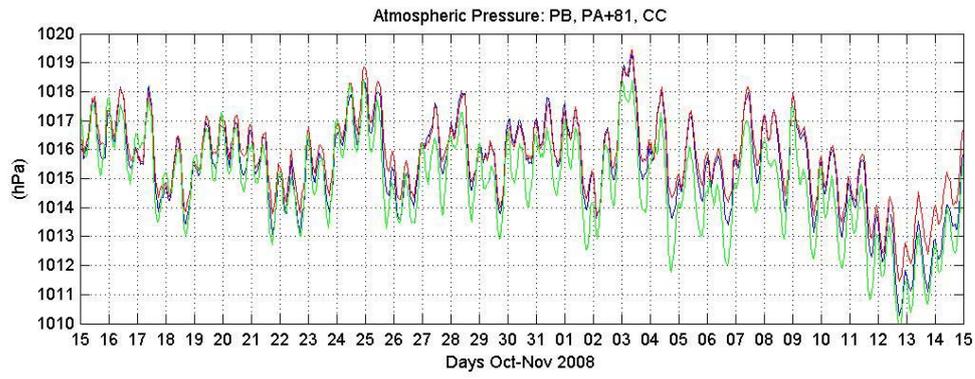
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2 FIGURE S3 a) Time series of relative humidity (5-minute averages) measured at PA (red)
 3 and PB (blue). b) As a) but for water vapor mixing ratio. c) Mean diurnal cycle of hourly
 4 relative humidity at PB. Thin gray lines show daily series. d) As c) but for PA. e) As c) but
 5 for water vapor mixing ratio. f) As e) but for PA.

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2 FIGURE S4 Time series of atmospheric pressure (hourly averages) measured at PA (red,
3 added 81 hPa), PB (blue), and Caleta Constitucion (green).