

ABSTRACT

J.J. Agenbag and M.J. Roberts (1996).

Variability of wind in the extreme southern Benguela region deduced from the Cape Agulhas pressure index.

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The Cape Agulhas Pressure index (CAP Index) approximates the sea level atmospheric pressure gradient between Cape Agulhas (35°S, 20°E) and a point to the south of that, in the west wind belt (40°S, 20°E) and was adopted as a means for monitoring variations in the wind over the western Agulhas Bank and southwestern Cape shelf region. Daily index values correlate moderately well with winds recorded at Cape Point.

This paper the index series August 1981 to April 1996 was analysed and the results provide insight into regional wind variability at time scales ranging from days to years.

- a) The average seasonal cycle (monthly means 1982-1995) exhibits a minimum value (westerly wind maximum) of 4.4 hPa in July and a bi-modal summer maximum (easterly maximum) with peaks in October and March respectively. This bi-modality in the CAP index arises from bi-modality in the pressure cycle at the point in the west wind belt.
- b) The most prominent inter-annual feature observed is the depression of the index values during warm ENSO events, of which there had been three during the data period, i.e. 1982/83, 1986/87 and 1991-1993. In each case the CAP reflected a reduction of the local easterly wind component during the summer months (October – March).
- c) On the time scale of days, the index oscillates with an average period of 8.3 days, but the period varies seasonally between a minimum of 7.2 days during October, and a maximum of 9.3 days during February. The minimum and maximum periods thus coincide with the two models in the CAP summer maximum. The oscillation zero-line also shifts seasonally. It is most negative during July with average peak and trough values of –0.6 and 8.1 hPa respectively – indicating consistent, though variable, westerly wind i.e. no wind reversals. The zero-line is most positive (i.e. favouring easterly winds) during February and October – in both instances oscillating between average peak and trough values of about 4 and –3 hPa. This result suggests that upwelling favourable winds of approximately equal strength occur in early and late summer but that event duration is more variable during early summer. ENSO events have no systematic effect on periodicity in the CAP index, but rather shift the zero-line of oscillations in the negative direction. That is the observed reduction of the average summer easterly wind component is a consequence of weaker easterly events and not fewer events. There is however considerable inter-annual variability in periodicity. For example, during the 1995/96 summer the average CAP index was high but the same time event duration were the shortest (7.3 days) within the data series.