Durations of Indian ocean crossings by English East India Company (EEIC) ships during the seventeenth through early nineteenth centuries

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1. Introduction

A catalogue of the British Library's collection of EEIC ship logs, created by Anthony J. Farrington while Director of the Library's India Office Collections, enabled Farrington et al. (1999) to infer changes in the strength of the Atlantic Trade winds from the times taken by passages between the Cape of Good Hope and St. Helena Island. The analysis is here extended to the crossings of the Indian Ocean. From the catalogue, passages were selected that listed arrival and/or departure dates for an eastern port immediately next to departure or arrival dates at the Cape. Of a total of 1304 such passages to some 40 destinations, 408 involved the same port, Madras, on the eastern side of the Indian subcontinent and provide a basis for statistical considerations.

2. Durations of Cape-Madras crossings

The Madras passages began with the 18th century and consisted of 230 eastbound crossings lasting on average 82.4 days, and 178 westbound crossings with an average duration of 105.5 days. The entire set of Madras passages is shown in Fig. 1 as a time series of 5-year averages with confidence intervals of ± standard deviation of the means. The eastbound/westbound differences at the start of the series and again in the 1800s resembled their average difference, but in between for a while the crossings took roughly the same times in both directions.

In the Indian Ocean the ships would not have encountered major currents such as the Benguela Current on the South Atlantic route between the Cape and St. Helena Island. The duration differences in Fig. 1 must therefore have been created by changes in the weather and especially in the strength and direction of the winds encountered.

3. Indian Ocean winds

The EEIC ships did not observe and record winds systematically. More recent data assembled in the Comprehensive Ocean-Atmosphere Data Set (COADS; Woodruff et al., 1998) show the monthly average winds of the region to have two distinct patterns in Fig. 2a, representing summer (May through September), and winter (November through March). These "monsoons" are separated by a transitional pattern in April and September, Fig. 2b. In the northern regions the winds are directed inland in summer and seaward in winter, while weak and variable winds are observed there in the two transitional months. Further south the monsoonal circulations shift the semi-permanent Indian Ocean anticyclone and its light-wind core north in summer and south in winter.

Sailing ships crossing the Indian Ocean presumably sought out the southern westerlies for eastbound crossings and easterlies for westbound crossings. This is suggested by the distribution of the COADS observations. Fig. 3a shows tracks thus

defined, and Fig. 3b the individual wind observations, for a winter month and a summer month.

4. Seasonal differences in the durations of Cape-Madras crossings

Of the 230 eastward crossings, 53 took place entirely in the five summer months, (between May 1 and September 30) and 12 entirely during winter (between November 1 and March 31). Of the 178 westward crossings, 21 fell entirely into the winter months, but none coincided entirely with the summer as here defined. It appears that westward passages were not attempted into the face of the early summer monsoon. Summer conditions can however be approximated by eight journeys which left Madras in late June and ended as late as early November against weakening westerlies near the Cape.

These numbers and the average passage durations for each category together with their standard errors are given in Table 1.

Table 1: Numbers and average durations of Cape-Madras crossings.

EASTBOUND:	SUMMER	WINTER
number	53	12
mean duration	67.0 days	85.9 days
standard error	1.8 days	2.0 days
WESTBOUND:	SUMMER	WINTER
number	8	21
mean duration	153 days	74.6 days
standard error	16.3 days	3.1 days

4. Discussion

The seasonal mean duration differences in Table 1 have magnitudes similar to those in Fig. 1 and reflect the influence of the monsoons. That makes it difficult to separate seasonal differences in crossing durations from the effects of longer-term changes in the strength of the monsoons themselves. Anomalies must be expected to arise also from synoptic-scale eddies which are known to create transient equatorial westerlies (e.g., Hogarth et al., 1959) and from multi-year changes resembling the El Niño/Southern Oscillation (ENSO) phenomena of the Pacific (e.g., Anderson, 1999).

All such changes would have affected also the durations of EEIC passages to and from other destinations, which in principle could be rendered comparable as deviations from their long-term averages, and could cover also the 17th century journeys before Madras became the prime EEIC port. A complete investigation would need to identify moreover possible operational delays and weather factors other than wind and will require the study of individual EEIC logs, which can be accessed only on site in the British Library.

References

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Figures

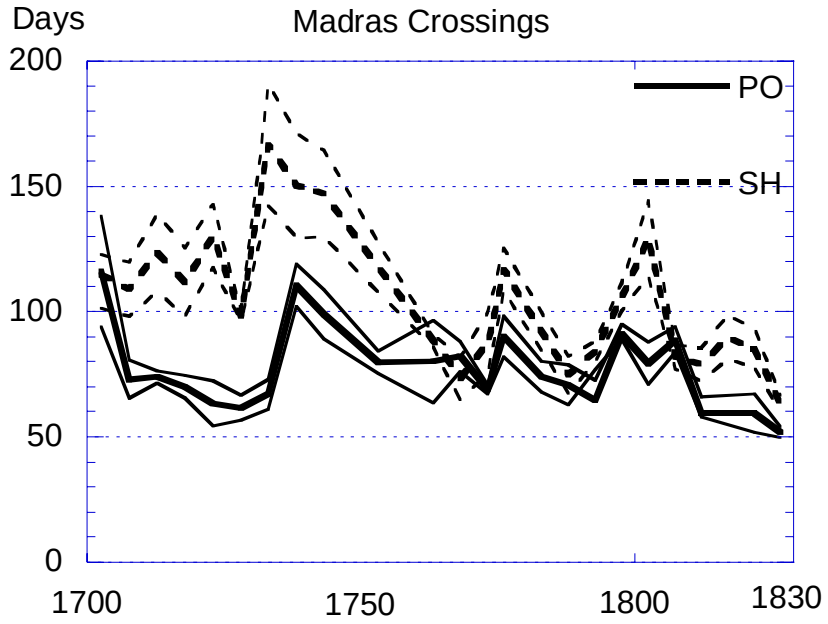
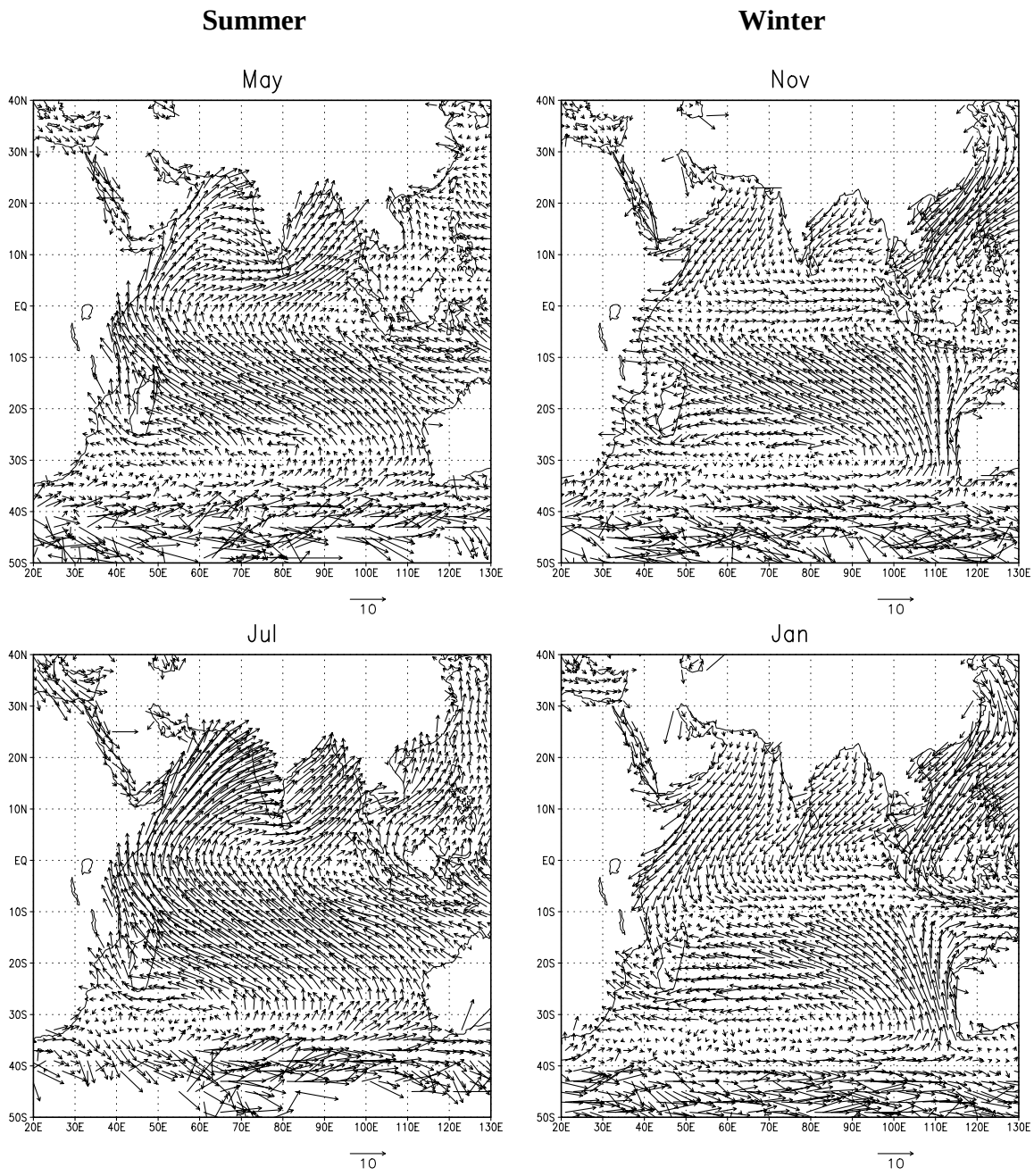


Fig. 1: Time series of 5-year average durations of crossings between the Cape of Good Hope and Madras, India (heavy lines), augmented and reduced by one standard deviation (thin lines). PO (full lines) = outward crossings, SH (broken lines) = homeward crossings.[1]

[1] Together these labels suggest that "posh" travelers should avoid the sun in *P*ortside cabins on *O*utward journeys and in *S*tarboard cabins on *H*omeward journeys.



a)

Fig. 2 (see caption on p. 5)

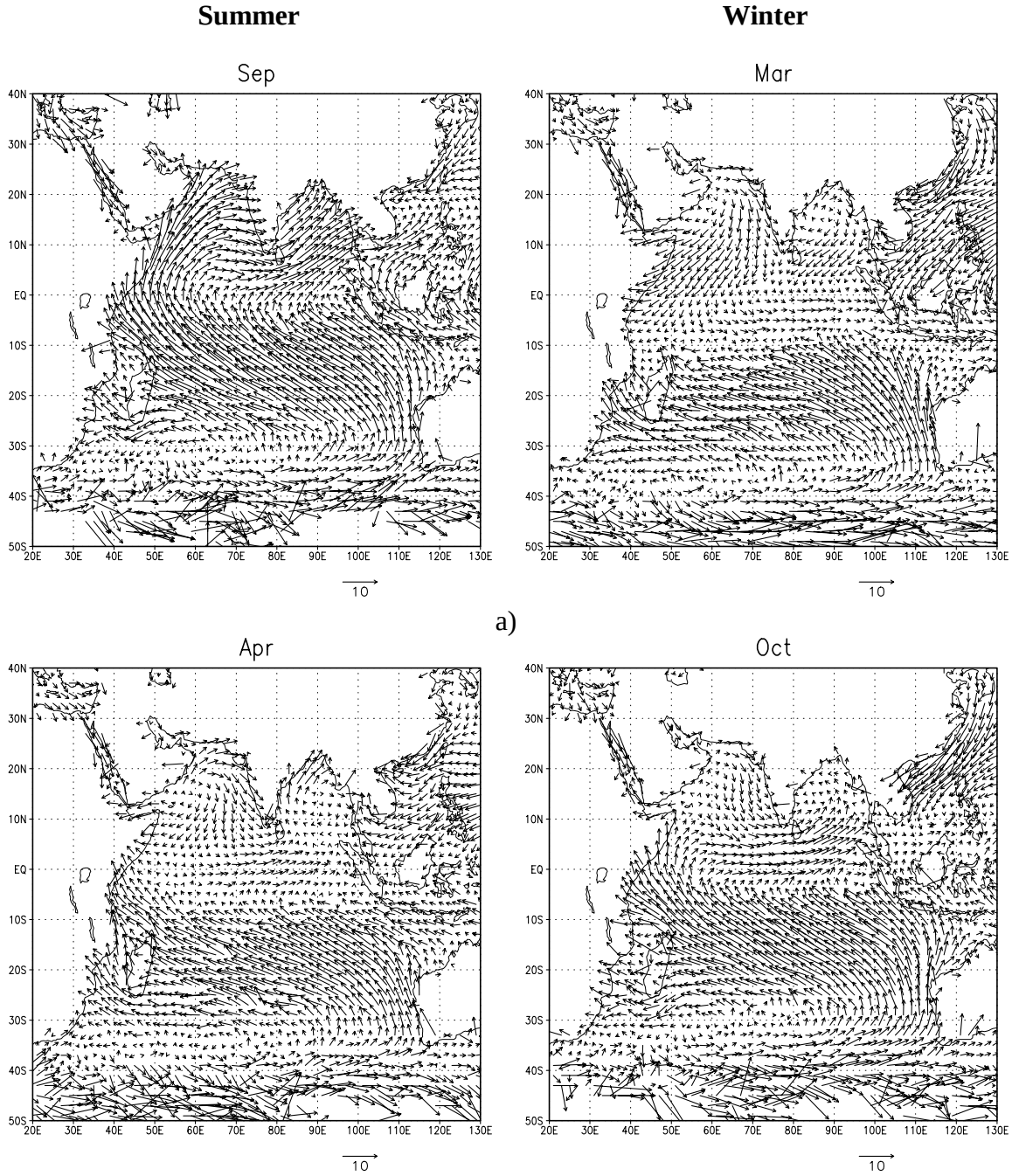


Fig. 2 (continued from p. 4): Monthly average winds over the Indian Ocean region, based on COADS data (Woodruff et al., 1998): a) Monsoonal wind fields. b) Transitional flow pattern. The length of a 10 m s^{-1} wind arrow is shown below each map.

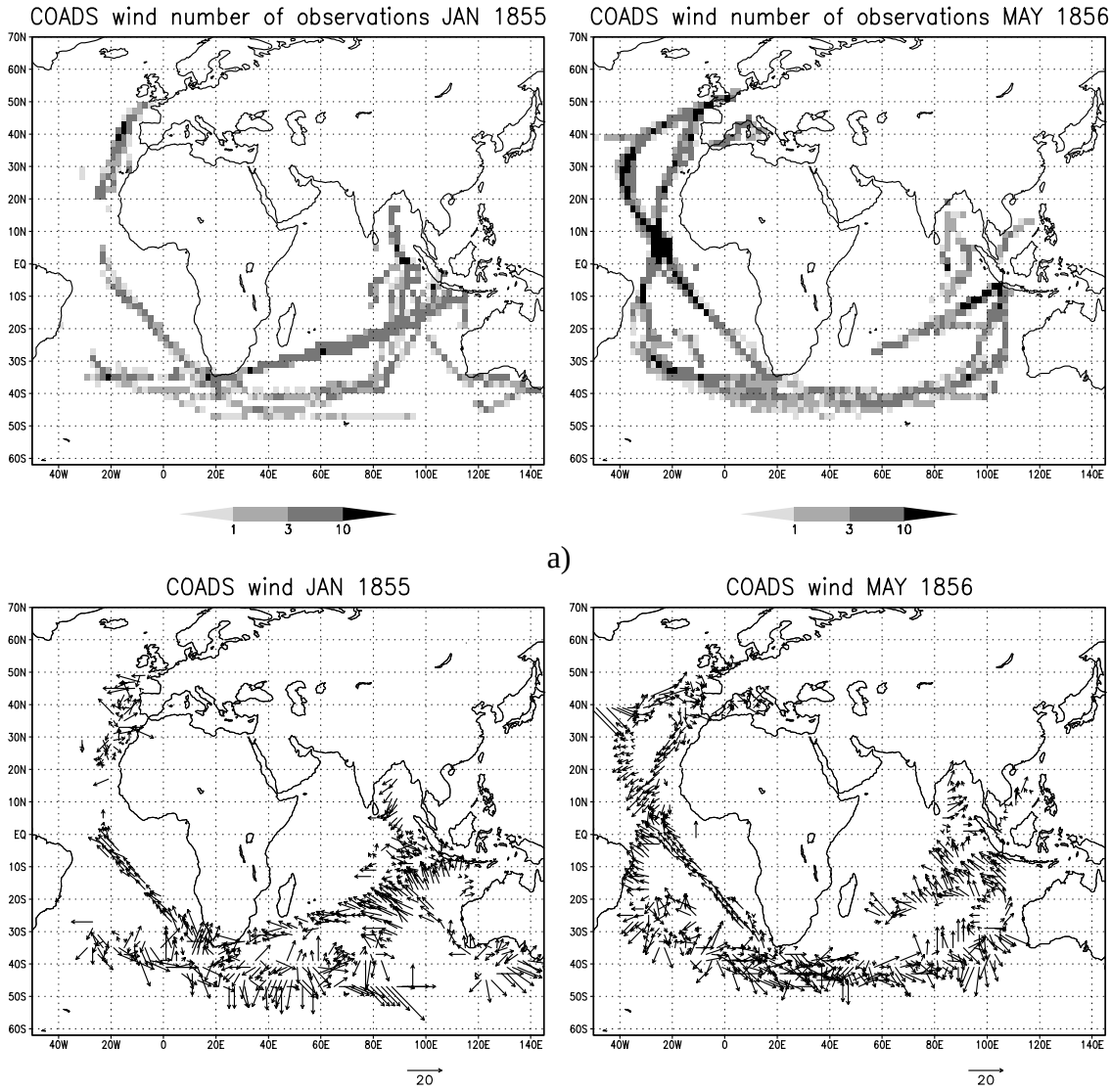


Fig. 3: COADS observations suggesting tracks used by sailing ships crossing the Indian Ocean in January 1855 (winter monsoon) and May 1856 (summer monsoon): a) Numbers of wind observations. b) The actual winds observed (the length of a 20 m s^{-1} wind arrow is shown below each map).