

TEAM UP TO STUDY CLIMATE CHANGE

NHA LOGBOOKS AT WORK

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In climate research, long datasets are invaluable. They help scientists establish baseline weather dynamics and variability, against which to measure changes over time, create models, and illuminate different components of the climate system. Unfortunately, pre-nineteenth century instrumental data from regions beyond Europe and North America is sparse. A growing field of scholarship addresses this gap by interpreting historical records. One of the richest troves of maritime weather information is contained in the vast archives of ships' logbooks, in which officers routinely recorded weather information over the course of their voyages.

Dr. Timothy Walker, professor of history at the University of Massachusetts Dartmouth and Dr. Caroline Ummenhofer, an oceanographer and paleo-climatologist at the Woods Hole Oceanographic Institute (WHOI), intend to tap an as-yet unexamined trove of climate data: U.S. whaling ship logbooks for voyages to the Indian Ocean, which invariably passed first through the Azores Islands region on their outbound journey. Building on the success of similar earlier projects, like the Atmospheric Circulation Reconstructions over the Earth (ACRE) project and Old Weather (which examined whalers' voyages to the Arctic), they propose to recover, quantify, and analyze climate records from several whaling logbook archive collections, starting with the NHA. The records whalers generated predate most extant instrumental climate data. Using whaling logbooks for Indian Ocean voyages held in Nantucket, oceanographers and historians working together, can push the instrumental climate record back over 220 years, to the late 1700s, with a much broader geographical distribution than is currently available to climate scientists.

The Indian Ocean is the least observed tropical – temperate ocean and particularly vulnerable to human influences. The Asian monsoon is a lifeline for a billion people, for whom small changes in monsoon rainfall and

associated extreme weather events can have disproportionate effects on agriculture and economic well-being. The project will provide a long-term context for variability of extreme weather, winds, and pressure changes across the “Roaring Forties” in the South Indian Ocean, one of the world's most remote and poorly observed ocean regions. We will also gather data from the same voyages to track changes in the Azores High, a large subtropical semi-permanent center of high atmospheric pressure in the North Atlantic. Whaling voyages to the Indian Ocean conveniently tie these two regions together.

Walker began working in the NHA archive in December 2018, seeking to survey and examine whaling voyage logbooks in order to gather and record daily shipboard observations about weather at sea in the Atlantic (Azores Region) and Indian Oceans. This pilot project archival survey will provide primary source data to be analyzed by climate scientists at the Woods Hole Oceanographic Institute, to broaden our understanding of North Atlantic and monsoonal Indian Ocean weather patterns in the eighteenth and nineteenth centuries. Walker and Ummenhofer will build up a mosaic of weather data points from scores of vessels, the officers of which recorded their position (latitude and longitude) almost every day (usually at noon), and recorded weather conditions in their ships' logs typically two or three times a day. Sophisticated weather modeling can be built on that inventory of data points. The project will add additional data points to a stock that already exists for merchant and military vessels, which by the eighteenth century tended to follow defined sea lanes (determined by weather and currents) more so than whaling ships, which followed the migratory patterns of their leviathan prey. Thus, the whalers are navigational outliers, recording weather in places where other types of vessels rarely ventured.