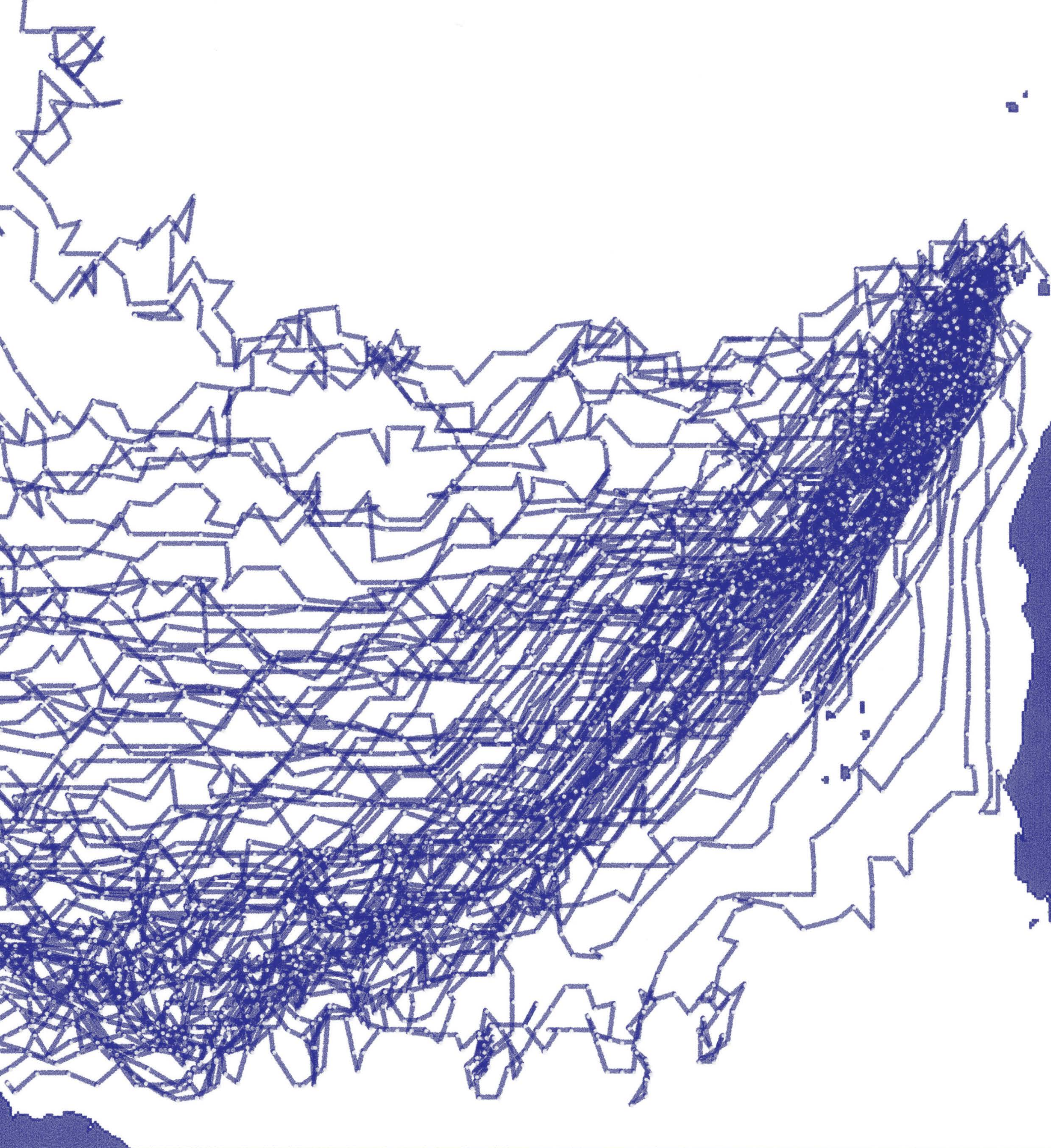

KON-TIKI FIELD REPORT SERIES VOLUME 10/2009

Drift Voyages across the Mid-Atlantic

by Richard T. Callaghan

THE KON-TIKI MUSEUM
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DRIFT VOYAGES ACROSS THE MID-ATLANTIC

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Despite the resistance to the idea of pre-Columbian crossings of the Mid-Atlantic in history and archaeology such crossings are likely. Crossings need not have been intentional and numerous examples exist in recent times. Many of these crossings are due to shipwreck and were accomplished with small open vessels. In some cases the occupants survived the voyage in others they did not. However, survival of the occupants is not necessary for Old World artifacts to be found in New World pre-Columbian contexts.

Lengthy drift voyages in open boats due to shipwreck or other misfortune are well known from the tropical Pacific (Levison et al. 1973:20-21; Howay 1944) under similar conditions to the mid-Atlantic. The maximum recorded drift with survivors seems to be on the order of seven to eight months. There are several recorded which covered distances of ca. 5500 km over a period of six to ten weeks and a great number covering shorter distances. On most but not all of these voyages at least some water was collected from precipitation but there are other sources such as collecting dew (Bombard 1986:61), pressing fluid out of fish and even utilizing the fresh water in the tube of toredo worms (Lee and Lee 1980:139-160).

Drift voyages in large vessels lasting considerably longer have been recorded in the North Pacific under harsher weather conditions. Brooks (1876) gives durations for drift voyages originating in Japanese waters ranging from 17 days to over 17 months. The longest voyage recorded is of about 17 months duration. The 17-month voyage ended with survivors being taken off at Latitude 32° 45' N. and Longitude 126° 57' E. This is approximately 667 km west of Los Angeles. The vessel was likely closer to the North American coast when further north. The fact that the ships were often laden with comestibles such as barley, rice, beans, dried fish, and oil accounts for how crew members were able to survive these lengthy drift voyages. As Brooks (1886:20) also notes the northern region of the Pacific experiences heavy rainfall, which would have supplied crews with at least intermittent access to fresh water.

Dening (1963:138-153) cites the limited empirical evidence of known drift voyages in Polynesia and suggests a common pattern of behaviour in which, sailors conclude they are lost early in the voyage and respond by allowing the vessel to drift before the wind with no attempt to navigate in a particular direction. This strategy allows close to the maximum distance to be covered in a given time when there is no clear indication of relative location.

Although open boat and larger vessel drift voyages across the mid-Atlantic have not received the same degree of attention as those of the Pacific they have occurred. Probably the best known in recent times is that of Alain Bombard (1986). Bombard crossed the Atlantic from the Canary Islands to Barbados in a 4.5 metre Zodiac boat with minimal provisions. His claim to have successfully relied on drinking seawater was later questioned by Hannes Lindemann (Lindemann 2007) who himself crossed the Atlantic twice, the first time in a 7.5 metre dugout canoe from the Canary Islands to Jacmel, Haiti. The second voyage was done in a small sea kayak from the Canary Islands to the Antillean island of St. Martin taking 76 days. Lindemann carried more provisions than Bombard but they would still be considered minimal.

These examples are of intentional voyages and unintentional drift voyages also have happened in recent times. Steven Callahan (1986) spent 76 days lost at sea. Seven days out of the Canary Islands he was shipwrecked and drifted in a life raft to the waters of Guadeloupe where he was rescued by local fishermen. Another example of drift from the Canaries to the Americas, though with a less happy outcome happened in 2006 (Tremlett 2006). A six metre yacht in poor condition was found 70 miles off Barbados. The eleven occupants were dead and it was suspected that 40-50 more individuals had been on board. The vessel was heading from the Cape Verde Islands to the Canary Islands with Senegalese immigrants. The vessel had been at sea for about four months.

What these examples demonstrate is that small vessels with or without survivors can drift across the mid-Atlantic at least as far as the Antilles. In fact any examination of the Pilot Charts of the Atlantic Ocean (Defense Mapping Agency 1995; 2001) shows that such drifts are inevitable. Even the intentional voyages cited here were for experimental reasons very sparsely provisioned. Given larger vessels that were likely much better stocked it seems reasonable that both small and large pre-Columbian vessels from off the Canary Islands found themselves on occasion in the New World with survivors. This is particularly true if a strategy such as that noted by Dening (1963:138-153) above for the Pacific was used by sailors lost at sea.

COMPUTER SIMULATIONS OF MARITIME CONTACT

Computer simulations have been used to elucidate several archaeological and historical problems dealing with issues of maritime colonization, culture contacts, and interaction. These simulations use detailed oceanographic, climatological, and anemological data. From this they can analyze how watercraft will react to changing ocean conditions throughout the year. The approach has been used worldwide including: the Pacific Islands (Avis et al. 2007; Irwin 1992; Levison et al. 1973), the Caribbean (Callaghan 2001, 2003a), between Ecuador and Mexico (Callaghan 2003b), Costa Rica and Colombia (Callaghan and Bray 2007), from Japan to North America (Callaghan 2003c), and other regions (Montenegro et al. 2006).

Such computer simulations can investigate a number of voyaging strategies. The two principal strategies are drift voyages and intentional voyages. In the analysis presented here drift voyages are considered. Investigating drift voyages limits the number of assumptions made by the program operator. Generally, if it is easy to drift from point A to point B it as easier to navigate between the two points once their relationship to each other is known. Intentional or purposeful voyages are better used to evaluate the level of navigational skill needed to travel between two points once their relationship is known.

THE COMPUTER MODEL

The simulation program used here is based on the United States Navy Marine Climatic Atlas (US Navy 1995) and has been expanded to include all of the world's seas and oceans with the exception of Arctic waters. The data is organized in a resolution of one degree Marsden squares (one degree of longitude by one degree of latitude). This resolution allows the effects of smaller and more variable currents to be accurately reflected in the outcomes. The program also automatically shifts to the database for the following month after the month originally selected for has expired. This feature better reflects the reality of changing wind and current conditions over long voyages. The operator has the option of defining success in different ways. Success can be defined as sighting land from a particular distance or as the vessel actually making landfall. Finally, the program allows the operator to change the bearing of a vessel during a voyage to reflect decisions made by the crew. This last feature is important when assessing the level of navigational skill required to reach a selected target.

For this study 100 simulations were run from just west of the Canary Islands for each month of the year. Vessels were allowed to drift before the winds and currents with no attempt to affect the course. This is a strategy that maximizes the distance covered when sailors are lost at sea with no reference points. Since there are a number of vessel types that could have been used it was decided to use generalized figures of drift following Levison et al. (1973). The maximum number of days for survivors was set to 200 days the maximum for open boat drifts.

RESULTS

For drift voyages beginning in January (Figure 1) all vessels reached the Americas within the 200 day maximum limit. Ten vessels reached the Central American coast between Panama and the Gulf of Honduras. The majority made landfall in the Antilles as far west as Jamaica. The remainder landed on the South American coast between the Gulf of Honduras and Fortelaza, Brazil. Vessels with drifts beginning in February (Figure 2) tended to be pushed further south, although all still made landfall within the maximum number of days. Two vessels landed in Panama and Cost Rica while sixteen landed in the Antilles. The rest landed in South America as far south as Rio de Janeiro. A small number of vessels were pushed back to the Canary Islands. Wind and current systems continued to push vessels southward in March (Figure 3). Only one landed on the Central American coast and ten in the Antilles. The rest landed on the South American coast within the 200 day maximum limit as far south as Santos. This pattern continues for vessels beginning to drift in April (Figure 4) with three vessels making landfall in Coast Rica and Panama. Only six vessels made landfall in the Antilles. No drift voyages exceeded the 200 day maximum.

Wind and Current patterns begin to shift in May (Figure 5) with most vessels making landfall in northeastern Brazil. Only one vessel reached Panama while seven vessels reach the Antilles north of Trinidad. A large number of vessels made landfall on Trinidad. One vessel landed on the coast of Africa. No vessels exceeded the 200 day limit. The northward shift in landfalls continued in June (Figure 6) with about 45% of vessels ending up in the Antilles. One made landfall in Panama. The majority of the rest of the drift voyages landed in northeastern Brazil and the Guayanas. Wind and current patterns again begin to change in July (Figure 7). Thirteen vessels landed on the coast of Africa while 22 exceeded the maximum 200 day limit. In the latter case vessels were caught in circular currents. Six vessels landed on the Central American shore between

Belize and Panama and six in the Antilles north of Trinidad. Aside from a few remaining vessels landing on the coast of South America the rest made landfall on Trinidad. This July pattern becomes more accentuated in August (Figure 8) when 21 vessels landed in the Antilles, three on the north coast of South America and two in Central America. Twelve vessels exceeded the maximum limit and the rest made landfall on the coast of Africa.

September (Figure 9) brings another major seasonal shift with all except six vessels making landfall in the Americas within 200 days. Three vessels made landfall on the north coast of South America while twenty vessels made landfall on the coast of Central America and one on the central Mexican coast. The remaining vessels landed in the Antilles. This pattern continues in October (Figure 10) with three vessels landing on the north coast of South America and ten vessels landing between Belize and Costa Rica. Three vessels landed on the Cape Verde Islands and one on the east coast of the United States. Three vessels exceeded the 200 day limit while the remainder made landfall in the Antilles. Voyages beginning in November (Figure 11) all landed in the Americas except for one which made landfall in the Cape Verde Islands. Seventeen vessels landed in Central America between Honduras and Panama and eight on the north South American coast. The remaining vessels landed in the Antilles. For December (Figure 12) five vessels exceeded the 200 day limit and one landed in the Azores. Seven made landfall on the north coast of South America and eight in Central America between Panama and Honduras. The remaining vessels made landfall in the Antilles.

DISCUSSION

From the simulations it is clear that for most of the year vessels disabled or lost at sea off the Canary Islands would likely make landfall in the Americas. This is particularly true from September through June. The majority of vessels would make landfall in the Antilles from September through January. The Antilles themselves act as a screen preventing large numbers of vessels from making landfall in the on the Central or North American mainland although some do and make landfall especially in Lower Central America. For landfalls in the Antilles the average duration of voyages is 70 days and for Central America and Mexico 120 days. This is well with in the 200 day limit for open boat survival recorded for the Pacific and for the Antilles within recent drifts and survival experiments. It is well within the limits of the 17 month drift voyages recorded for larger vessels in the North Pacific. However, as noted above survivors are not necessary for Old World artifacts to be found in New World pre-Columbian contexts.

A point to consider given the high number of landfalls in the Antilles is the date of human occupation there. The Windward Islands in the southern range of the Lesser Antilles do not appear to have been occupied until the first centuries AD (Callaghan in press). Some but not all of the Leeward Islands to the north, Antigua in particular were occupied perhaps as early as the 3rd millennium BC (Fitzpatrick 2006:397). Some however, were not occupied until sometime after 500 BC (Haviser 1997). The Greater Antilles were occupied even earlier than Antigua, prior to 4000 BC (Moore 1991). Although, Jamaica is an anomaly, as it does not appear to have been occupied until about AD 600 (see Callaghan 2008). If ships were not severely disabled in the voyage survivors may have opted to continue westward with the winds and currents rather than stay on an unoccupied island. Were voyagers to be in a position to raise a sail and attempt to proceed due west they would likely reach land further north in the Bahamas as did Columbus on his first voyage (see Fuson 1987). This could be a strategy used by sailors after initially becoming lost as most of the year would it would have been difficult to sail eastward given the limited ability of earlier Mediterranean vessels to sail to windward (Casson 1971). Further, since the Bahamas were occupied relatively late, sometime after AD 800 (Keegan, 1992:48), seafarers from the east may have been induced to continue westward.

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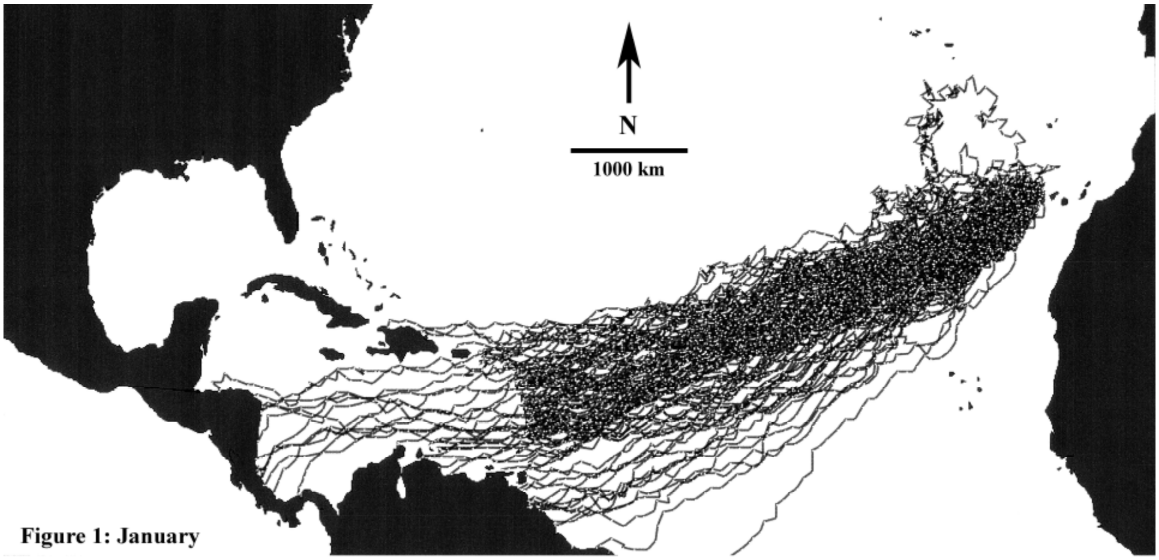
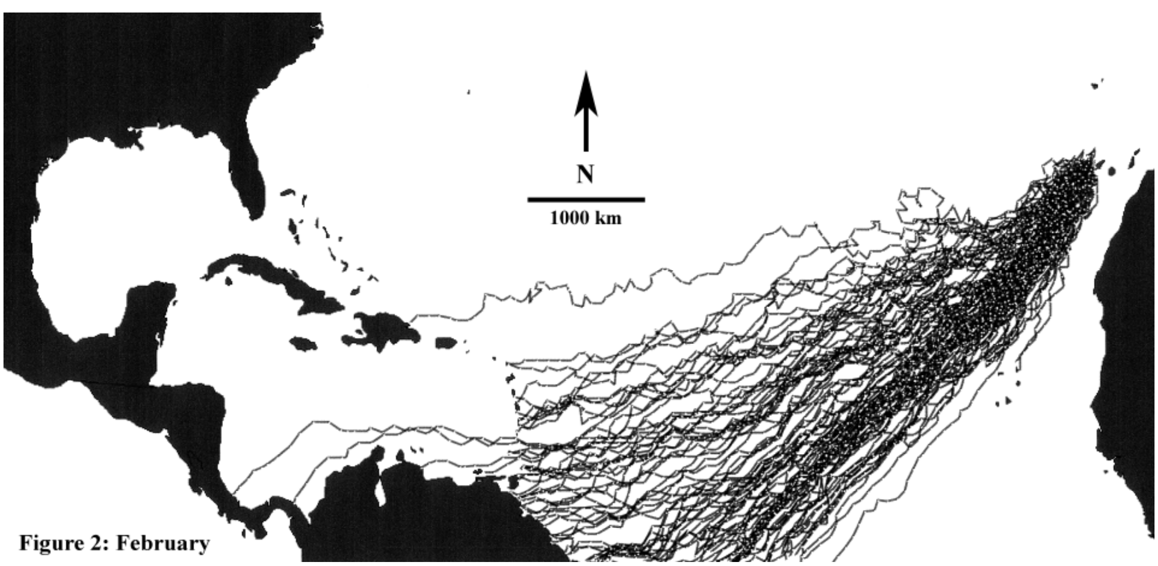


Figure 1: January



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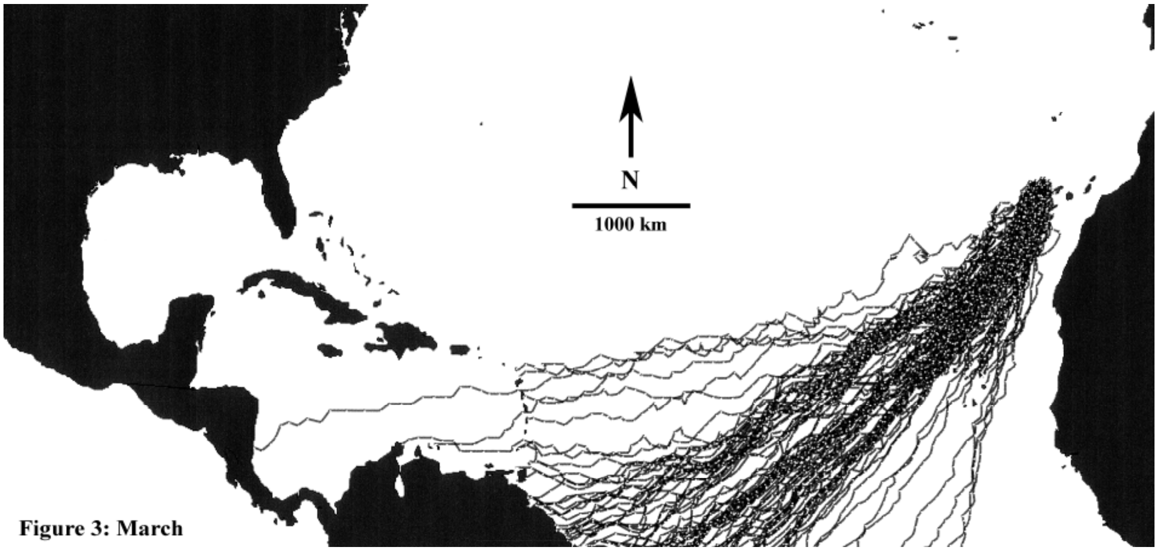

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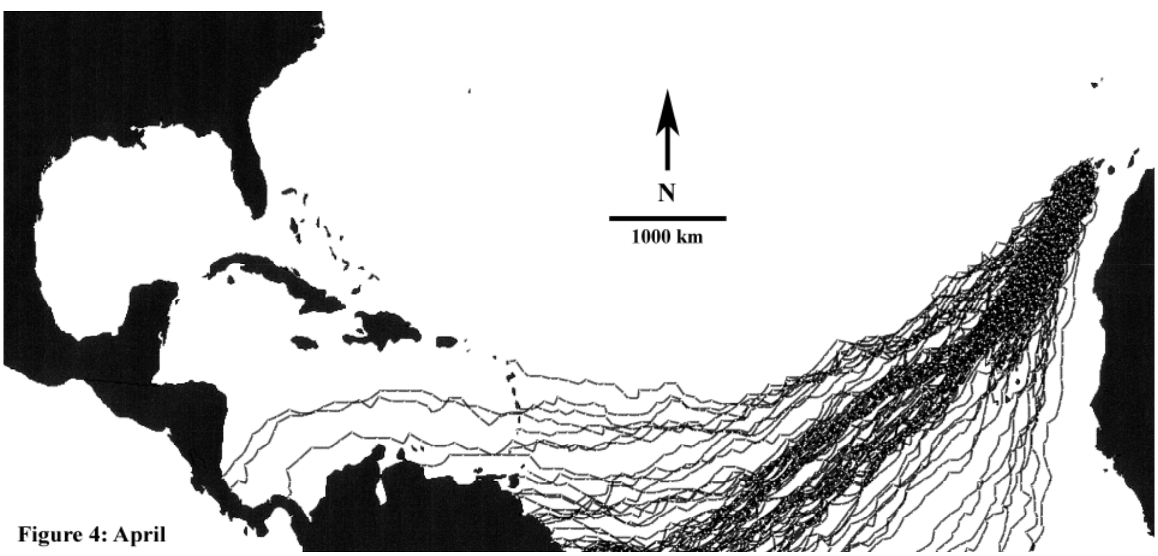

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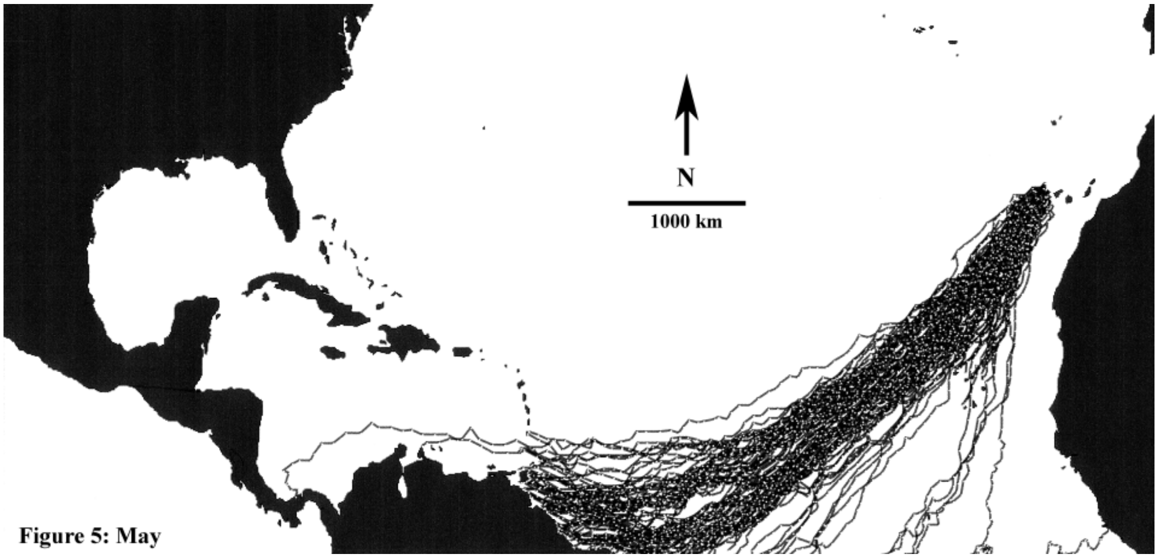


Figure 5: May

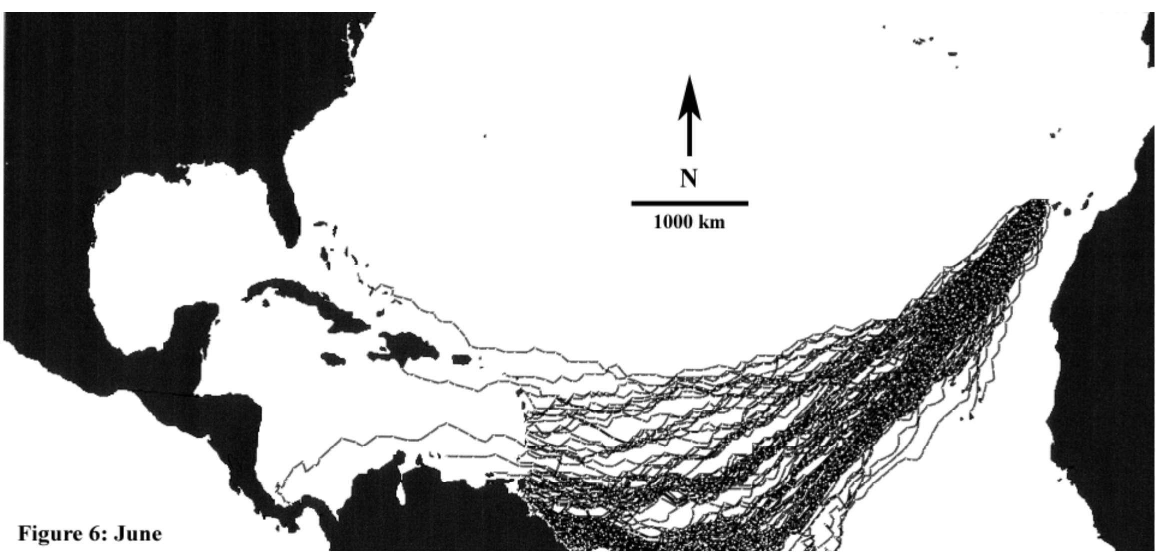
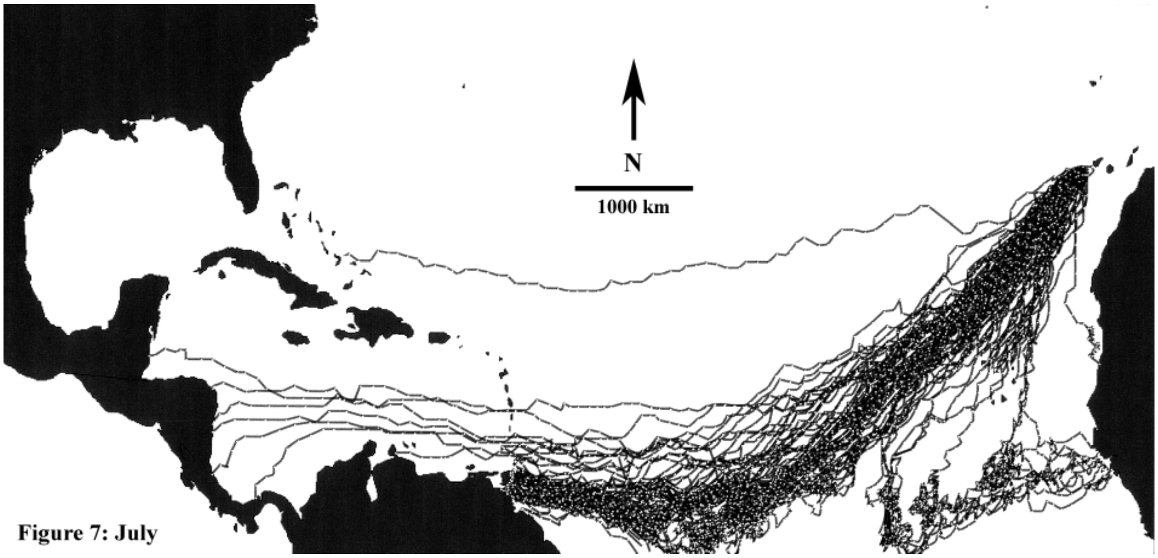


Figure 6: June



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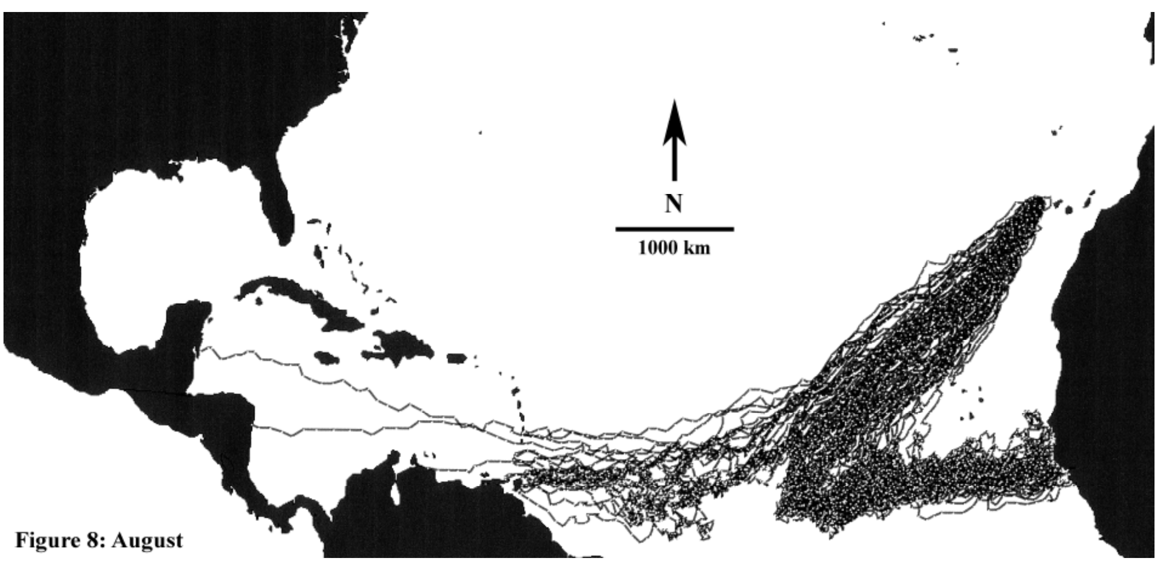
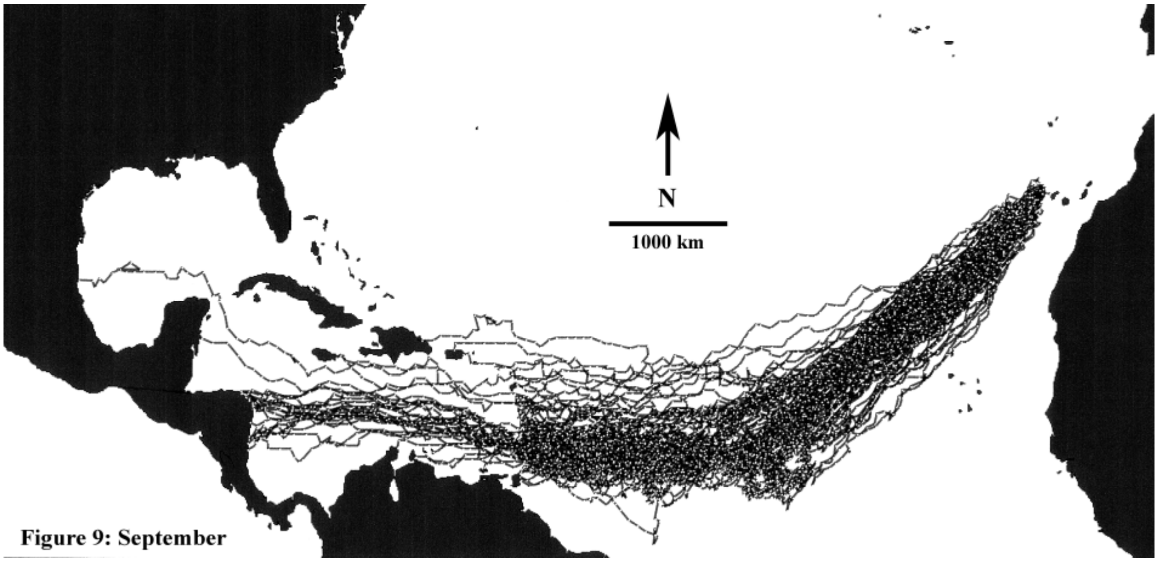


Figure 8: August



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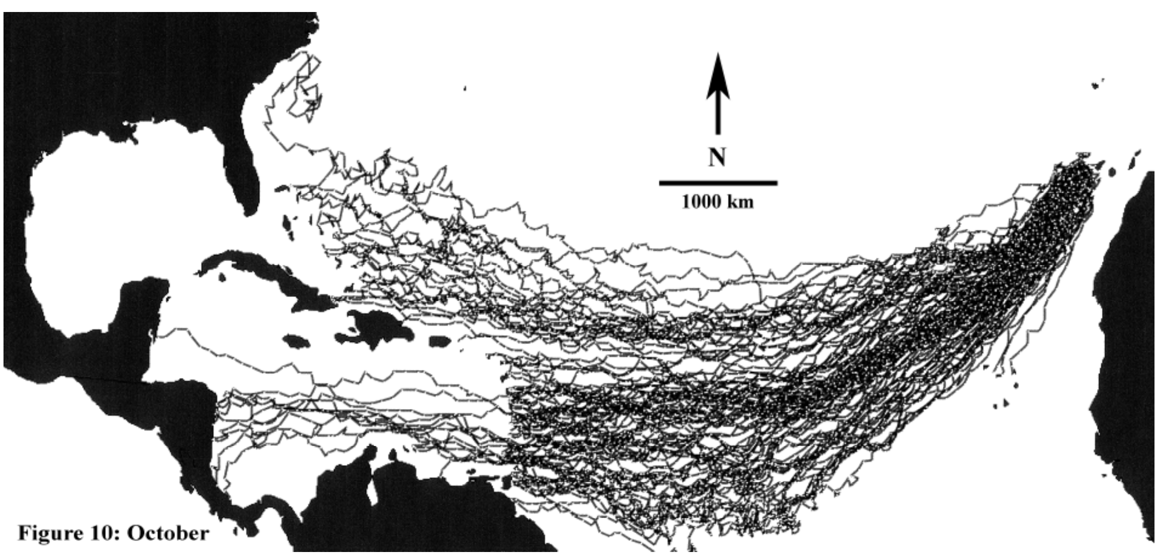

Figure 10: October

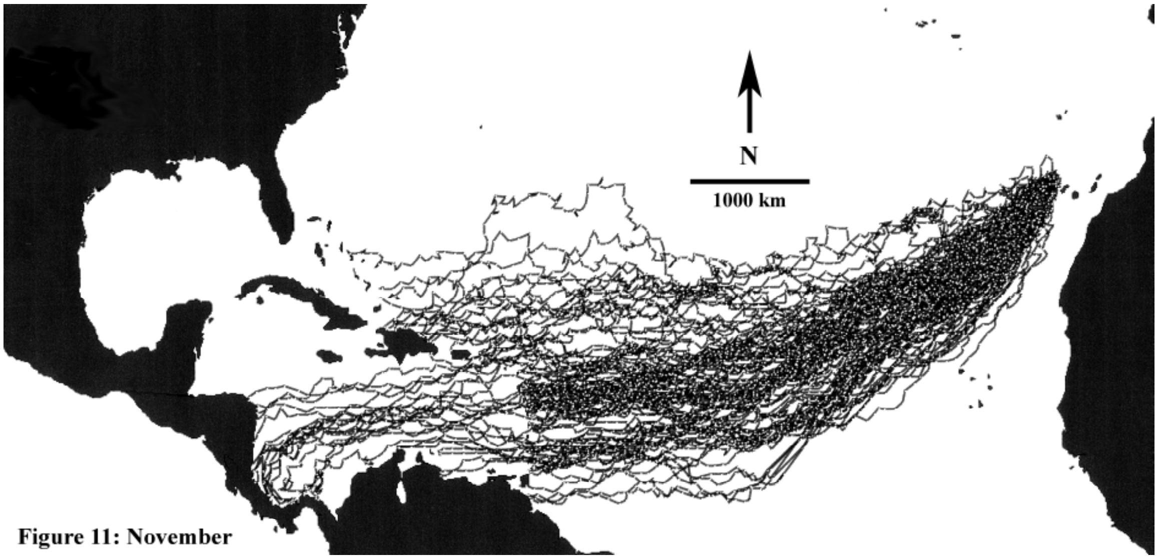

Figure 11: November

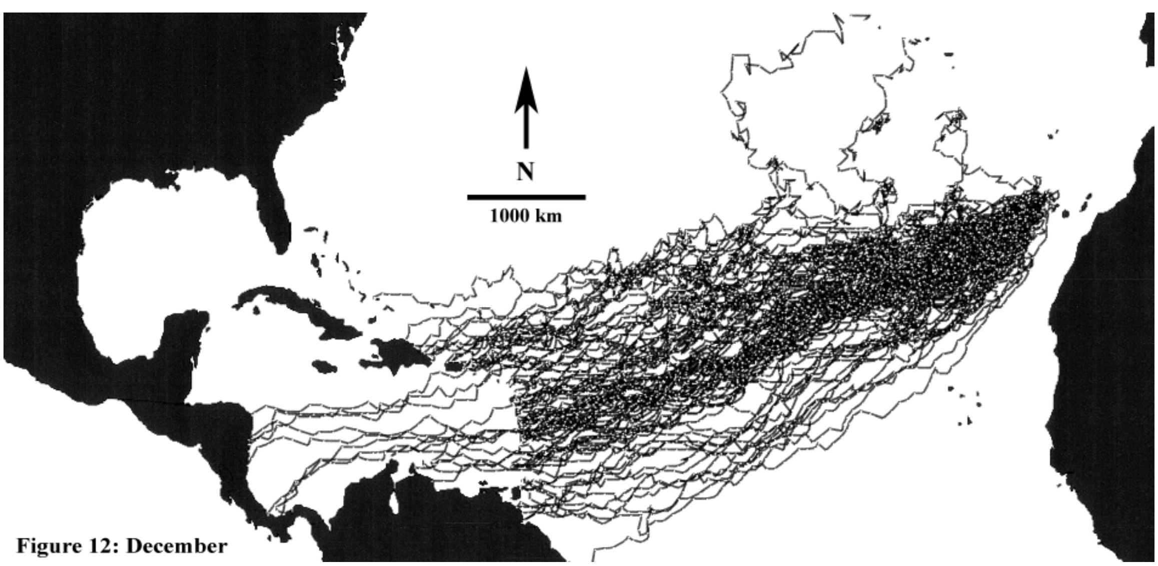

Figure 12: December

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