



The use of GIS in reconstructing old ship routes

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In 2003 the EU project CLIWOC was successfully completed with the delivery of an impressive final report and an even more impressive data set. CLIWOC contains data from old ship logbooks (1750-1854) that needed a range of corrections and adjustments before they could be used for further research. One of the problems was the so-called 'shifting prime meridian'. A methodology was developed to deal with this, making use of GIS software (i.e. ArcMap).

1. Introduction

The current prime meridian (Greenwich) was only accepted internationally in 1884. Before that time, a wide range of alternatives were used. In CLIWOC not less than 646 different prime meridians were identified.

Another problem was the inaccuracy of the determination of the ships' positions. Although sailing around the globe, the precision of the ships' navigation was not high. Small daily inaccuracies in estimating their positions increased the error towards the end of their voyage. Not knowing exactly where they

reference meridian was given, this was copied as well; in other cases Greenwich was assumed to be the prime meridian.

2.2 Converting the data

After inserting the data into the database, the positions were converted into decimal positions, correcting for the given prime meridian.

2.3 Plotting the route

The first plot of the ship's route usually was a mess (see Fig. 2). However, at certain points a clear break in the positions can be observed.

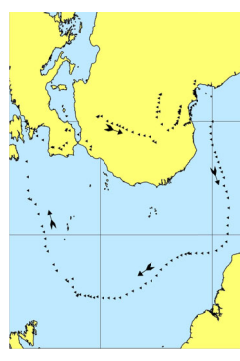


Figure 2. Raw positions of HMS Surprise (1750-1751) on her return voyage from England to the Gulf of Guinea without correcting the longitude to the current standard, i.e. Greenwich. During the voyage back no transition in zero meridian occurred by absence of land sightings.

2.4 Reconstructing the route

Following the latitudes of these breaks, often a well known island or pronounced cape is found. Using the longitude of these places as an offset for the ship's longitude, an acceptable route can be reconstructed (see Fig. 3).

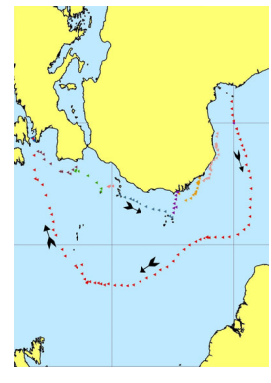


Figure 3. Corrected positions of HMS Surprise after converting the longitudes to the Greenwich meridian. Every color refers to the use of another zero-meridian: Start Point, Ushant, Cape Roxent, Madeira, Point Negro, Isle of May Bay, Cape St. Maries, Bananas and (at the start of the trip back) St. Thomas, respectively.

2.5 Incremental errors

Due to the inaccuracy in the determination of the ships'

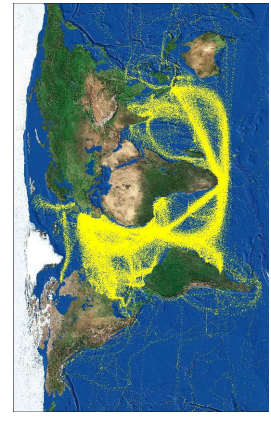


Figure 4. All available ships' positions in the CLIWOC database (1750-1854), clearly depicting the favorite (and favorable) routes.



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