

ACADEMIA DE MARINHA

# THE MIGHTY RED SEA

Comunicação apresentada no  
«INTERNATIONAL SEMINAR ON MARITIME ACTIVITIES IN INDIA  
WITH REFERENCE TO THE PORTUGUESE 1500-1800»  
UNIVERSIDADE DE GOA

JOSÉ MANUEL MALHÃO PEREIRA



LISBOA — 2001

ACADEMIA DE MARINHA

# THE MIGHTY RED SEA

Comunicação apresentada no  
«INTERNATIONAL SEMINAR ON MARITIME ACTIVITIES IN INDIA  
WITH REFERENCE TO THE PORTUGUESE 1500-1800»  
UNIVERSIDADE DE GOA

JOSÉ MANUEL MALHÃO PEREIRA



LISBOA — 2001

*Execução gráfica:* INSTITUTO HIDROGRÁFICO – Lisboa

ISBN – 972-781-060-8

# The Mighty Red Sea

*Comunicação apresentada na Universidade de Goa durante um Seminário em 15 Abril de 2001 por José Manuel Malhão Pereira.*

## Introduction

For many thousands of years a great amount of the traffic between east and west has been made through the Red Sea, whose waters were ploughed by oared and sailing vessels.

But all the maritime traffic depends upon the physical conditions of the waters sailed, and the meteorology and hydrography of the seas and the physical characteristics of its coasts are extremely important, and should be taken into account when it is necessary to interpret maritime history.

Being the Red Sea a narrow strip of water of 80 to 120 nautical miles in breadth, and a length of about 1200 nautical miles, with a great amount of shoals and islands along its coasts, and being surrounded by mountainous land, it offers very peculiar characteristics, which affected decisively its navigation.

As all maritime transport is made mainly on sailing ships, the wind and its direction is the most important factor to take into account, which sometimes is forgotten.

The purpose of this paper is to give an overview of the physical conditions of that sea and its consequences to the navigation of sailing and also oared vessels.

It is also our intention to try to contribute to the interpretation of the maritime traffic through the Red Sea, or its absence in some areas, and to give some justifications for some specific events or actions taken along history.

## The physical and hydrographical conditions of the Red Sea

The Red Sea is a relatively small strip of water of 1200 miles that separates the Arabic Peninsula from the extreme Northeast African continent. Its average width is 120 miles.

On the image shown Annex I, it is clearly visible that it is surrounded, all along its coasts and very close to its waters, by high mountains<sup>1</sup>. The image also shows that the Red Sea is like the bottom of a valley, with its deepest part in its middle area.

All along the coasts there is a great amount of reefs and shallow water. No rivers flow into it, and its northern half is rainless.

A hydrographical approach will be better understood by the consultation of the British Admiralty map of the area<sup>2</sup> (Annex II). In this chart, the 200 meters and the 1000 meters depth contour are highlighted.

We can observe that the above referred depth lines extend longitudinally all along the Red Sea, from the Gulf of Aden to the entrance of the Gulf of Suez. The Gulf of Suez itself has a depth in its mid channel of 30 to 60 meters. We can also verify that the area inside the 200 meters depth contour has a width of 80 to 100 miles, except in the area of the Dalak Bank, near Massawa.

All this shows that the area is very safe for navigation along its middle channel, because it is wide and deep, although there are many reefs along its Asian and African coasts (the Farasan and Dalak Banks), especially between the 15<sup>th</sup> and the 20<sup>th</sup> parallel of latitude.

## **The Red Sea in some of the ancient voyagers' reports**

But before a more deep study of the remaining physical conditions and its influence on ships operations, we are going now to review briefly some of the descriptions of the Red Sea made by ancient voyagers, that illustrate the way the area was used for commerce, and also its sailing conditions, mainly after the period of intense use of the North Indian Ocean as a trade route.

Agatharchides of Cnidus (second century B.C.), when commenting the transport of elephants from Ptolomais of the Hunts to Berenice, gives a clear idea of the difficulties in sailing to the north, with heavy sailing ships in the area north of 18° N.<sup>3</sup>

The voyage was made on a sailing ship, or on a modified galley, capable of transporting ten elephants and having accordingly an appre-

---

<sup>1</sup> *The Great Geographical Atlas*, New York, Rand Ma.cNally, 1989, p. 181.

<sup>2</sup> Admiralty chart n.° 4704, London, United Kingdom Admiralty Office.

<sup>3</sup> Agatharchides of Chnidus, *On the Erithraean Sea*, transl., ed., Stanley M. Burstein, London, The Hakluyt Society, 1989.

ciable draft<sup>4</sup>. The voyage from Ptolomais (near present day Suakin, 18° N), to Berenice (the Madina Baranis of today, at 23° N), a little more than 350 miles, was normally not successful, although «The region presents no problems for oared ships, as waves do not come in from afar, ... But the elephant transports, which ride deep in the water because of their weight ... encounter great and terrible dangers sailing in these areas. For running with sails set and often continuing through the night, because of the strong winds, they are wrecked when they run aground on the rocks or submerged bars».

He says after, that «These places are completely inhospitable, and rarely people sail through them on ships.». The situation is after dramatically described, with the need of the survivals of the wreckage to eat some of the weaker elements of the crew.

In fact the voyage was made in shallow waters against the prevailing wind, as can be seen after we explain the conditions of navigation in the area.

*The Periplus of the Erythraean Sea* also describes the harbours in the two banks of the Red Sea, sailing from the extreme north to the south<sup>5</sup>. It is very interesting to recognize that the main harbours of the African coast that are indicated by the author of this first century A.D. report, are Arsinoe, Myos-hormus, Berenice, Ptolomeis and Adulis, no reference being made to the other places depicted by Agatharchides in its *On the Erythraean Sea*.

In which concerns our study, we extract the following useful information from the text and from the editor's notes (see fig. 1):

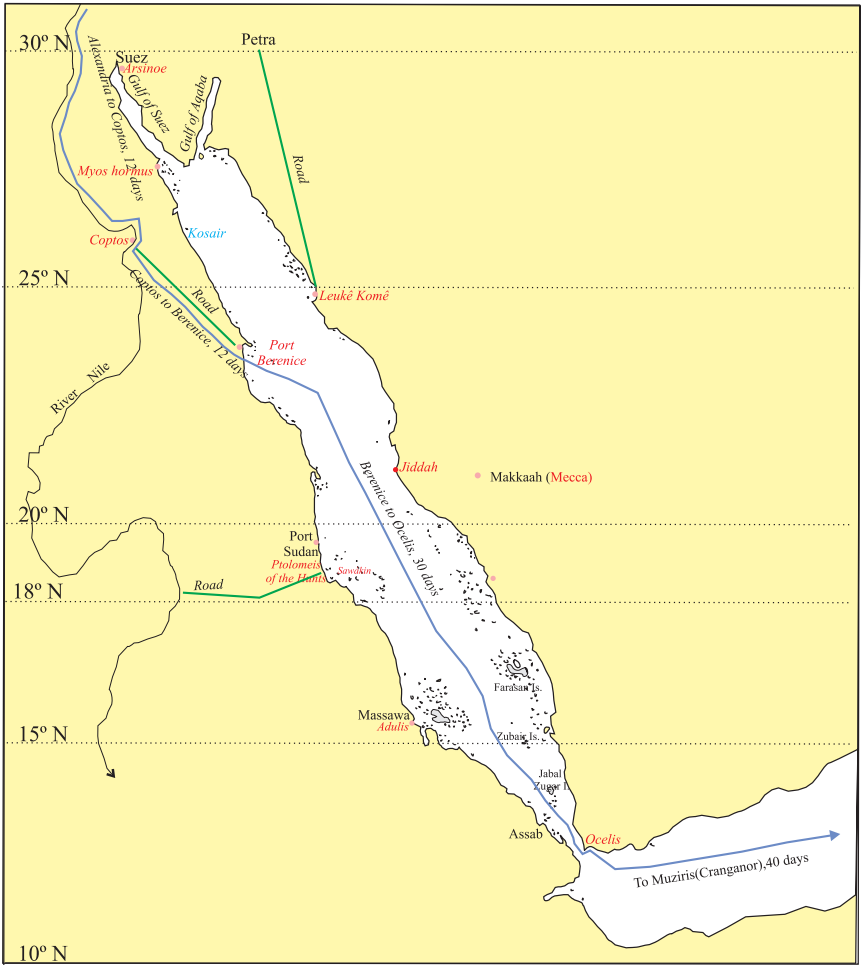
- Berenice, the second important harbour coming from the north, was connected inland with Coptos, by a road distant «258 roman miles, or 11 days»<sup>6</sup>.
- Ptolemais of the Hunts had a «... trade route from the Red Sea to the Nile, terminating near Meroe, and corresponding closely to the railway recently built ...»<sup>7</sup>.
- «... to the left of Berenice, ... eastward of the adjacent gulf, there is another harbour and fortified place, which is called White Village,

<sup>4</sup> *Idem*, pp. 8, 141-143. The editor, in footnote 3 of page 141, comments about this characteristic of the ship, called *elephantegos*, which are in doubt.

<sup>5</sup> *The Periplus of the Erythraean Sea*, transl., annot., Wilfred H. Schoff, New Delhi, Mushiram Manoharlal, 1995

<sup>6</sup> *Idem*, p. 55, (editor note).

<sup>7</sup> *Idem*, p. 60, (editor note).



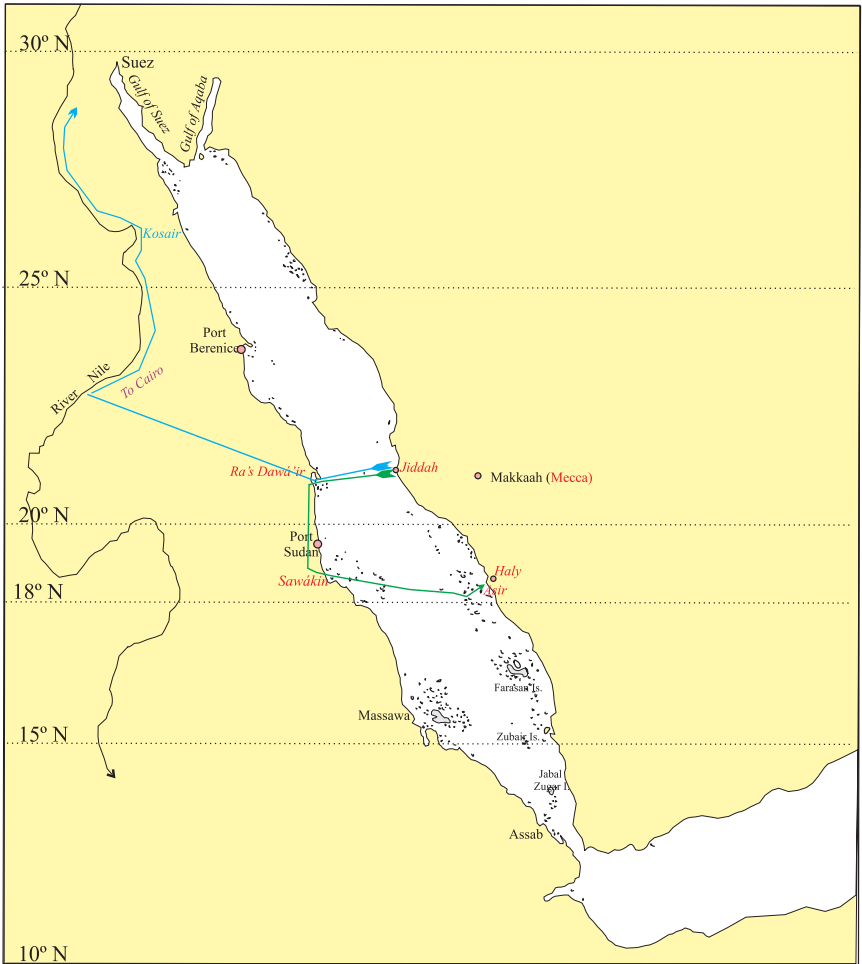
**Fig. 1** – Land routes and the voyage from Alexandria to Muziris (Cranganor), in the *Periplus*

from which there is a road to Petra ...»<sup>8</sup>. As per the editor's note, this harbour (named Leukê Komê), is placed on 25° 07' (N), 37° 13' (E), on the opposite bank of the Red Sea, and is on the regular caravan route that connects Aden to the Mediterranean.

- A very interesting description of the voyage from Egypt to India, extracted from Pliny<sup>9</sup>. The voyage to India began on Alexandria, up the Nile to Coptos («three hundred and eight miles; being the voy-

<sup>8</sup> *Idem*, p. 29, text.

<sup>9</sup> *Idem*, pp. 232-234.



**Fig. 2** – The two Red Sea experiences of Ibn Battúta

age performed, when the Etesian<sup>10</sup> winds are blowing, in twelve days.), with «the aid of camels» to «Berenice, situated upon a harbour of the Red Sea and distant from Coptos two hundred and fifty seven miles.»<sup>11</sup>, being this distance covered in 12 days. Thirty days sailing, after leaving Berenice «in midsummer» (probably July),

<sup>10</sup> Pliny refers to the southwest monsoon wind, and so refers to its period, which is from June to September.

<sup>11</sup> Pliny describes the watering places for the camels, and the difficulties of traveling in the desert.

they arrived Ocelis<sup>12</sup> (a bay in front of Perim island, in the straits of Bab al Mandab), in the extreme southern limit of the Arabian Peninsula. Forty days after, with the aid of the «Hippalus», they will arrive at Muziris (present day Cranganor). The return voyage is made in December, with «... a southeast<sup>13</sup> wind, and upon entering the Red Sea, catch the south-west or south.» No more details are given about the voyage in the Red Sea.

A present excellent work on the dynamics and antecedents of the extensive sea trade between Imperial Rome and India, based mainly on archaeological discoveries at a colloquium held in 1986 at the Archaeological Institute of America in San Antonio<sup>14</sup>, gives also the following interesting information:

- The first paper, by Lionel Casson, which describes the voyage to India and back «at the time of Periplus», did not give any clear information about the return voyage through the Red Sea<sup>15</sup>.
- Steven E. Sidebotham describes, on the second paper, the main six ports of the Red Sea during Roman times. Much archaeological evidence is compared with written sources and some references are made to the difficulties of sailing from south to the north in the Red Sea, and also to the canals made in the northern part to connect

---

<sup>12</sup> For the identification of the geographical names, see the appropriate notes of Willfred Schoff, who gives a large overview of the different possibilities. We adopt his opinion.

<sup>13</sup> In reality should be northeast, because it is the northeast monsoon wind that blows in the area in December.

<sup>14</sup> *Rome and India. The Ancient Sea Trade*, ed. Vimala Gegley and Richard Daniel De Puma, Madison, 1991.

<sup>15</sup> *Idem*, pp. 8-11. The author only says that «the return voyage was no problem, for the northeast monsoon is the answer to a sailor's prayer» (p. 9), and tries to justify the outgoing voyage in the Indian Ocean during the southwest monsoon (very difficult on account of the strong winds and the rough seas), by the superior technology of Roman shipwrights, building stronger ships than those of the Arabs, that were made of sewn planks of wood. We think that in here there is some misunderstanding of the problems involved, because the Portuguese trade was made with the same policy, with the southwest monsoon, and like the author says in the Roman times, during its last period, when the winds are lighter and the Indian harbours are already opened. So we did not understand clearly the point of view of the author, because the voyage is not as difficult as explained. And the Arab stitched boats were good enough for the mild conditions of the end of the monsoon period, being not necessary, for that time of the year, specially strong ships. This is also the opinion of the author of the last published paper, David White House (p. 216).

their waters to the Nile. But also an interesting conclusion is expended, which is that «for a variety of reasons, this sea route [the Red Sea-Indian Ocean maritime route] never completely supplanted the overland route». Berenice is considered to be «the largest and most important» harbour in the area, which extends its importance from first century B.C. to probably the Byzantine period. No details are given about the conditions of navigation in the Red Sea.

Abou Zeyd Haasan, an Arab that in the end of the 9<sup>th</sup> century A. C. wrote about the travels of Soleyman et Abou-Zeid-Hassan, says the following, when reporting the route made by ships from the harbour of Shiraf, inside the Persian Gulf, to the Red Sea<sup>16</sup>:

– Les navires de Syraf, lorsqu'ils se dirigent du côté qui est situé à la droite de la mer de l'Inde, et qu'ils entrent dans la mer de Colzom, s'arrêtent à Djidda. Les marchandises qui sont destinées pour l'Égypte, sont transportées de Djidda dans des navires particuliers à la mer de Colzom. Les navires de Syraf n'osent pas s'avancer sur cette mer, à cause des difficultés de la navigation et du grand nombre de rochers qui sortent de l'eau. Ajoutez à cela que, sur les côtes, il n'y a ni gouverneurs ni lieux habités. Un navire qui vogue sur cette mer a besoin de chercher, pour chaque nuit, un lieu de refuge, de peur d'être brisée contre les rochers; il marche le jour, mais il s'arrête la nuit. Cette mer, en effet, est brumeuse et sujette à des exhalations désagréables. On ne trouve rien au fond de l'eau ni à la surface. Cette mer est loin de ressembler aux mers de l'Inde et de Chine.

This is the best report till now, from the ones that we selected, of the difficulties of sailing through the Red Sea.

Ibn Battuta, who confesses that «never travelled on sea before», has had two bad sailing experiences on the Red Sea. The following are

---

<sup>16</sup> Édouard Charton, *Voyageurs Anciens et Modernes*, 3 tomes, Paris, Bureaux du Magasin Pittoresque, 1869, tome 2, p. 150. Abo Zeid Hassan, born in Syraf, was not really a voyager, but an amateur of geography, who modified and completed the report of the professional voyages made to India and China by Soleyman et Abou-Zeid-Hassan, born in Bassora, and with his merchant office in this Persian Gulf town. We quoted the text, which corresponds to the translation of the original Arab text in the French language.

the principal interesting informations contained in his report of the two voyages<sup>17</sup>:

- Intending to sail in a *jalba*<sup>18</sup> from Jidah to Yemen, also on the Arabian coast, the wind and rough seas brought him to the African coast of the Red Sea, to an harbour north of Swakin (Ra's Dawa'ir), from there by land to the area of Suakin and after in a boat to the island with the same name. It seems that a south contrary wind was the responsible for this deviation.
- From Swakin they sailed in six days till Hali, which is near the coast, being its harbour at 18° 36' (N in the coast of Yemen. Another Yemenite harbour was reached further south.
- Battuta says: «No sailing is done on this sea at night because of the number of rocks in it. At nightfall they land and embark again at sunrise. The captain of the ship stands constantly at the prow to warn the steersman of rocks.»<sup>19</sup>
- In an attempt to go, in another occasion, from Jeddah to Egypt<sup>20</sup>, Battúta tried at first a ship bound to Qusayr (Kosair), that he found unsafe and take another, that took him again to the previous harbour on the African coast. The boat bound to Kosair foundered some days latter, and very few escaped.
- After that harbour they made a voyage by land to Aydab, Edu, and finally through the Nile to Cairo.

A sketch of the voyage is in figure 2, where the harbours and towns touched by Battúta are in italic and red.

---

<sup>17</sup> *Ibn Battúta Travels in Asia and Africa, 1325-1354*, transl., annot., select. By H.A.R. Gibb, London, George Routledge & Sons, 1929. Second reprint, New Delhi, 1997.

<sup>18</sup> *Jalba* can be the *jalia* of Portuguese texts, which according to Humberto Leitão in his *Dicionário*, is a «embarcação menor que a galeota com 15 remos por banda, muito ligeira, usada antigamente no comércio e na guerra por alguns povos da Ásia». See, Humberto Leitão e J. Vicente Lopes, *Dicionário da Linguagem de Marinha Antiga e Actual*, 3ª ed., Lisboa, Edições Culturais da Marinha, 1990, p. 310. Jerónimo Lobo refers also to a small boat called *gelva* in which he made a voyage from «Maçuá» to «Suaquem», made of stitched planks of wood that was appropriate to sail in the Red Sea. It is, in our opinion, the same type of boat. See, Pe. Jerónimo Lobo, *Itinerário e Outros Escritos Inéditos*, Lisboa, Civilização, 1971, pp. 294, 503. And Rodolfo Dalgado is very clear about this, defining *gelva* or *gelaba* as a «Pequeno barco do Mar Vermelho». See Sebastião Rodolfo Dalgado, *Glossário Luso-Asiático*, Coimbra, Imprensa da Universidade, 1919, I vol., p. 428.

<sup>19</sup> *Idem*, pp. 106-107.

<sup>20</sup> *Idem*, p. 123.

We now quote from Marco Polo the Portuguese translation of his text, which says in Chapter XLVI of the third book<sup>21</sup>:

- In Aden there is «... hum nobre porto ao qual concorrem muytos navios de India, que trazem muytas especiarias aromaticas. E os mercadores que as ally compram. Dalli as levam a Alyxandria. E dos navios deste porto as mudam em navios pequenos. E per sete jornadas as levam per hum ryo. despoys as poeem sobre camelos. E per .XX. jornadas vam com os camelos atee que cheguam ao ryo de Alyxandria. e alli as poeem outra vez em navios. E as levam atee Alyxandria. E este he ho caminho mais ligureyro e maais breve que os mercadores podem fazer ...».

We are going to try to make a sketch of the proposed route, which can have many interpretations, in fig. 3. It seems to us anyway, that the cargo in Aden was transferred to small boats and shipped to the African coast of the Red Sea, after in camels to the River Nile and after in boats again to Alexandria.

We consider that the «rio de Alyxandria» is the river Nile, which, related to the first transit in boats for seven days, makes this interpretation coherent. It also agrees with the physical conditions of the Red Sea, as it will be more deeply explained bellow.

The *Comentários de Afonso de Albuquerque*, have a great amount of useful information, because they are based on the letters he sent to the king<sup>22</sup>. Being Albuquerque a sailor, all his informations are very accurate in the point of view of navigation. From the text of the *Comentários* related to the naval operations of the great *Armada* of Albuquerque, that in February of 1513 departed from Goa to attack and occupy Aden and other towns inside the Red Sea, we summarize the following:

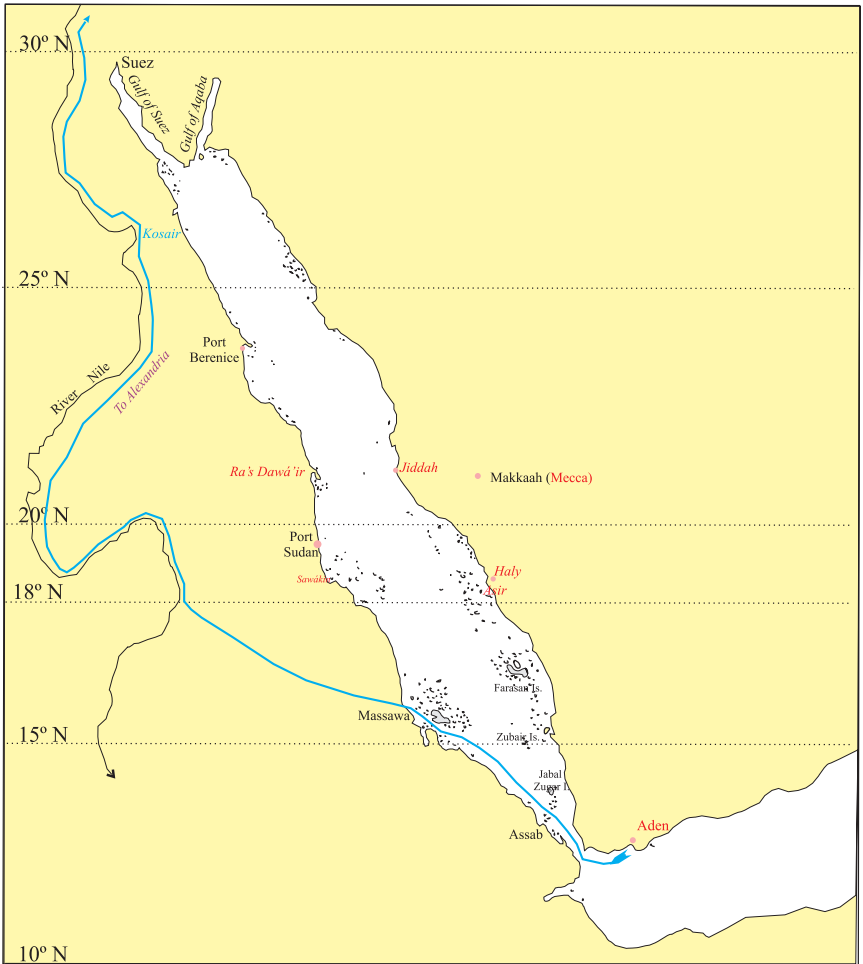
- The loss of the *captures* (small boats that were towed by the ships to be used inside the strait of Babel Mandab), owing to the rough conditions at the entrance of the Red Sea, with the wind blowing against the current<sup>23</sup>.
- The information relative to the departure of the ships of the *moors* from India, which is in November, December, January or February, some of them also departing in March, which is too late, because in this month the *ponentes* (westerly winds), already blow in the area<sup>24</sup>.

<sup>21</sup> Marco Paulo, *O Livro de Marco Paulo*, conforme a impressão de Valentim Fernandes, Lisboa, Biblioteca Nacional, 1922, p. 75, r. do livro terceiro.

<sup>22</sup> Brás de Albuquerque, *Comentários de Afonso de Albuquerque*, 5.ª ed., pref. Joaquim Veríssimo Serrão, Lisboa, Imprensa Nacional-Casa da Moeda, 1973, Tomo II.

<sup>23</sup> *Idem*, tomo II, Parte IV, p. 7.

<sup>24</sup> *Idem*, tomo II, Parte IV, p. 9.



**Fig. 3** – Our interpretation of Marco Polo’s description of thre route from Aden to Alexandria

- That from Aden the merchandise from India is brought to *Juda*, *Méca* and *Suez*, although it is not clearly explained what are the means of transportation between Jeddah and Suez<sup>25</sup>.
- The news of the attack of Aden, were sent to Suez by *camelos de posta* (a courier of camels), by the sheik of the town. This means that the authorities had no confidence in the efficiency of maritime transport for that purpose<sup>26</sup>.

<sup>25</sup> *Idem*, tomo II, Parte IV, p. 15.

<sup>26</sup> *Idem*, tomo II, Parte IV, p. 28.



Fig. 4 – Tracks followed by Afonso de Albuquerque after the attack of Aden

- The pilots hired by Albuquerque the *rubans*, received thirty *cruzados* to bring the ships to *Judá*. There is not any other reference of other harbour than this one<sup>27</sup>.
- The winds are always westerlies in the winter and easterlies in the summer. No reference was made to a different system of winds in other parts of the Red Sea<sup>28</sup>.
- Albuquerque could not navigate to *Judá*, because they were

<sup>27</sup> *Idem*, tomo II, Parte IV, p. 32.

<sup>28</sup> *Idem*, tomo II, Parte IV, p. 35.

already in May, being *too late*, so the winds were already from the west and northwest (*poentes*). The fleet left the island of *Camarão*,<sup>29</sup> inside the Red Sea in the Arabian coast, on the 15<sup>th</sup> of July. It is very interesting to note that the voyage to the islands was with a southeast wind and the return voyage with a following wind, in this case the northwest wind. Albuquerque has arrived «Camarão» just in time, because immediately after, the wind changed for «poente» or west. Fig. 4 is a schematic diagram of our interpretation of the routes of Albuquerque.

Other very interesting and contemporaneous information is given by Francisco Rodrigues in his *Livro* where, for example, the survey of the area to the west of Kamaran islands, ordered by Albuquerque, made by a caravel where Rodrigues embarked, is clearly reported by him<sup>30</sup>. It is also evident that the sailing in the area was affected by a constant contrary wind, from the northwest, that prevented the recognition of Massuá, which was very near the island of *Dalak* where the caravel anchored. A sketch of the routes of this caravel is included in fig. 5.

The *Suma Oriental* of Tomé Pires also gives interesting information relative to the Red Sea, from which we quote the following<sup>31</sup>:

- The best navigation from the entrance of the Red Sea is to *Camaran* (Kamaran today). It is much more difficult to sail to *Juda*. And much worst from *Juda* to *Toro*.
- From *Toro* to Suez «... he passagem de barcos ...», which in our opinion means that the goods are first transported to *Toro* (by land), and after they go to Suez by boat.
- The navigation is in general very difficult, being only performed by day, anchoring during the night in the many anchorages sheltered by the reefs and shallow waters.
- All the merchandise from India is disembarked in Jeddah. There is after a description of the route to Cairo, which is not very clear, but seems to be all by land, via Meca, Medina and Cairo. The days spent travelling between those towns are, according to the text: Aden-Jidah (by sea), 10 days; Jidah-Meca, 1 day; Meca-Medina, 4 days; Medina-Cairo, 40 days.

---

<sup>29</sup> *Camarão* are the present day *Kamaran* islands and bay, situated in the Arabian coast at 15° 20'N.

<sup>30</sup> *A Suma Oriental de Tomé Pires e o Livro de Francisco Rodrigues*, ed. by Armando Cortesão, Coimbra, Universidade, 1978, pp., 106-108.

<sup>31</sup> *Idem*, pp. 135-141.

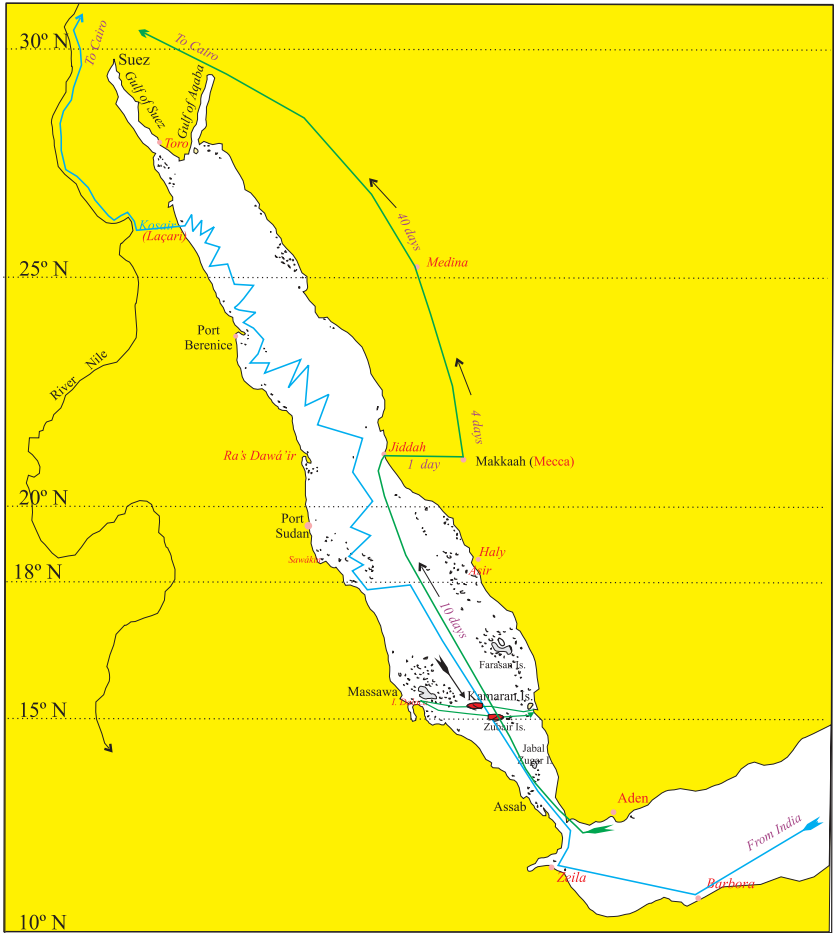


Fig. 5 – Our interpretation of Tomé Pires’s description of 2 routes to Cairo. The track of the caravel sent by Afonso de Albuquerque to survey the Massuá area in May, 1513

- There is another route on the African coast: «Zeila»-«Barbora» «Dalaqua»-«Laçarij», after this last harbour by land to the Nile in three days, followed by 10 days sailing in the Nile to Cairo<sup>32</sup>. Our interpretation is also included on the sketch of fig. 5, where we consider *laçari* as Kosseir.

Duarte Barbosa, when speaking about «Çues» and the spices that came to this harbour from «Juda», says that «These they carried from Juda in very

<sup>32</sup> *Idem*, p. 141.

small craft, and then loaded them on camels, and carried them by land to Cayro, whence other traders took them to Alexandria, and there they were bought by the Venetians;»<sup>33</sup>.

When referring to «Juda, a Seaport» says that «every year ships from India were accustomed to go with spices and drugs, and thence went back to Calecut with much copper, quicksilver, verdegris, ... At this port of Juda they put the said drugs and spices on board small ships for Çuez, as has been related above».<sup>34</sup>

After Albuquerque's unsuccessful expedition to Aden, his successor, Lopo Soares de Albergaria tried to attack Jeddah, but again the difficult conditions of navigation on the waters of the Red Sea prevented the taking of the town. In fact, the impressive Armada of Lopo Soares entered the Red Sea on the 9th of March, where contrary winds and rough seas occasioned the sinking of one of his ships<sup>35</sup>.

After passing near Kamaran islands, Jeddah was sighted, but a contrary wind, blowing during 15 days, delayed its entrance in the harbour. Again, the coral reefs, which defended the town, the narrow access channel and the small space for the manoeuvre of such a great fleet of more than 35 ships, prevented the success of the operation. The need for water made the fleet to call Kamaran islands, where he stayed till the end of July, waiting for the end of the southwest monsoon to cross the Straits and the north Indian Ocean, with less wind. The subsequent badly planned attack of Zeila, in the African coast, which has been burnt, before his men got the necessary food, and the need for another expedition to Barбора, some miles to the west, showed again the difficulties of manoeuvring in those areas, with the strong winds and currents due to the height of the southwest monsoon, at the end of July<sup>36</sup>.

---

<sup>33</sup> *The Book of Duarte Barbosa*, ed. annot. by Mansel Longworth Dames, 2 vols., New Delhi, Asian Educational Services, 1989, p. 46.

<sup>34</sup> *Idem*, pp. 46, 47.

<sup>35</sup> Fernão Lopes de Castanheda, *História do Descobrimento e Conquista da Índia pelos Portugueses*, ed. M. Lopes de Almeida, Lisboa, Lello & Irmão, 1979, vol. I, Livro IV, pp. 888-893. See also, Saturnino Monteiro, *Batalhas e Combates da Marinha Portuguesa*, vol. I, 1139-1521, Lisboa, Sá da Costa, 1989, pp. 239-246.

<sup>36</sup> *Idem*, pp. 902,903. The fleet was completely demoralised, and part of it stayed behind the Governor, when he decided to follow to Ormuz, with a strong favourable wind that blew some day. One of the ships that remained in the straits had to stay there for the winter, because they were already in September and the monsoon was at its end. With easterly winds, the ship tacked between the two capes, and finally found an island, where its captain was murdered.

Other attempt to attack Jeddah has been made by Lopes de Sequeira, successor of Lopo Soares de Albergaria, with another great fleet. The ship of the governor sank in the entrance of the straits, the fleet managed only to go till 120 leagues from Jeddah, sailing by day and anchoring by night, with contrary winds, although they were still in March<sup>37</sup>.

On the 25<sup>th</sup> of May, after being in *Massuá* and *Dalaca*, and returning to Ormuz, a big storm in the straits sunk a galley and the majority of the small boats that were being towed, putting also in danger some of the ships, which shows again the roughness of the straits and the uncertainty of the wind, specially in the latitudes 18° to 20°N.

Before the great expedition of D. Estêvão da Gama in 1540/41, Henrique da Silveira occupied Massuá, António de Miranda attacked the Kamarin Is., and Henrique da Silveira again tried to subdue Aden, without success. Never the Portuguese hold any durable position in the area, and the main reasons were the difficult physical conditions for naval operations, combined with difficulty to get water and food and the terrible heat.

Another interesting information which illustrates the conditions of the navigation in the area, specially to the north of Jeddah, is that Ibn Majid, the famous Arab pilot, only covers, in the twelfth Fa'ida of his famous book, the area to the south of this harbour<sup>38</sup>. The explanation of this, given by Tibbets, is that Ibn Majid (and other pilots), only describe «the part frequented by Indian Ocean sailors and ships either for pilgrimage or for trading purposes and this fact is curiously confirmed by Abu Zaid, ... who states that Siraf boats never go beyond Jidah, Red Sea boats there take over the trade»<sup>39</sup>. This is a clear reference of transshipment of goods from big ships to small boats.

This is only a small sample of the information that we can have of the difficulties of navigation in the Red Sea.

And when we were listening to the lessons given by professor Jorge Flores, two or three years ago, we were thinking about the contradictory information given by all our predecessors. In fact, if we look at the hydrographical map of the area (Annex II), it seems that the Red Sea is dip in the middle, the reefs are only on its coasts, and if we want to go to Suez, and we have a following wind, there will be no problem.

<sup>37</sup> *Idem*, vol. II, p. 40-59.

<sup>38</sup> G.R. Tibbets, *Arab Navigation in the Indian Ocean Before the Coming of the Portuguese*, London, The Royal Asiatic Society of Great Britain and Ireland, 1971, pp. 243, 398.

<sup>39</sup> *Idem*, p. 398.

So why so many land transits, so many transhipments of goods to smaller boats, hence so many expenses in workmanship and taxes?

Let us now analyse more deeply the environmental conditions of the Red Sea.

## **Winds and currents**

The pattern of the wind in this sea is very peculiar, and is mainly influenced by the mountains and by its narrowness. The wind tends to follow the direction of its coasts, that is northwest to southeast.

On account of the pressure distribution along the year, the winds in average have the direction and strength shown on the sketch in Annex III, adapted from meteorological charts contained in the *Red Sea Pilot* of the British Hydrographic Department, where the winds from the north are highlighted in black, the winds from the south in grey and its Beaufort force in numeric.

It is evident from the images that:

- The average winds are mainly from the north.
- Its direction is parallel to the coast.
- There is a small period of the year when the wind is from the south.
- The north half of the Red Sea is only, in average, affected by northerly winds.

More specific statistical material obtained at sea and in land stations, also gives the following information<sup>40</sup>:

- North of latitude 18° N, winds are mainly north northwesterly throughout the year in the central and eastern parts of the area. In the western part of it, those winds are predominant till the 16th parallel.
- South of latitude 18°N there is a reversal of the wind direction from October to April, when the predominant winds are south-southeasterly. This is mainly due to the influence of the northeast monsoon in the North Indian Ocean. In this period the southerly winds of this

---

<sup>40</sup> The majority of information is from *Red Sea Pilot*, London, Hydrographer of the Navy, 1944 and 1987.

area are stronger than the northerly winds of the northern part, its mean force being 4 to 5 Beaufort. Near the straits of Bab-Al-Mandab it can reach and exceed force 6.

- The separation between these two areas is with calms and light winds.
- During the height of the southwest monsoon, from June to August, the winds are from the northwest throughout the area.
- The southwest monsoon also increases the force of the northwest wind that blows all along the Red Sea.
- Strong currents affect the Gulf of Aden, and the winds, mainly during the southwest monsoon, are very strong, with rough seas.

It is clear from this information that the prevailing winds are from the northwest throughout the year in all areas of the Red Sea, with a winter period of reversal in its southern part, where southerly winds are blowing. Figs. 6 and 7 illustrate these two situations.

In the Gulf of Aden and the southern coast of Arabia, the winds form part of the monsoon circulation of Asia.

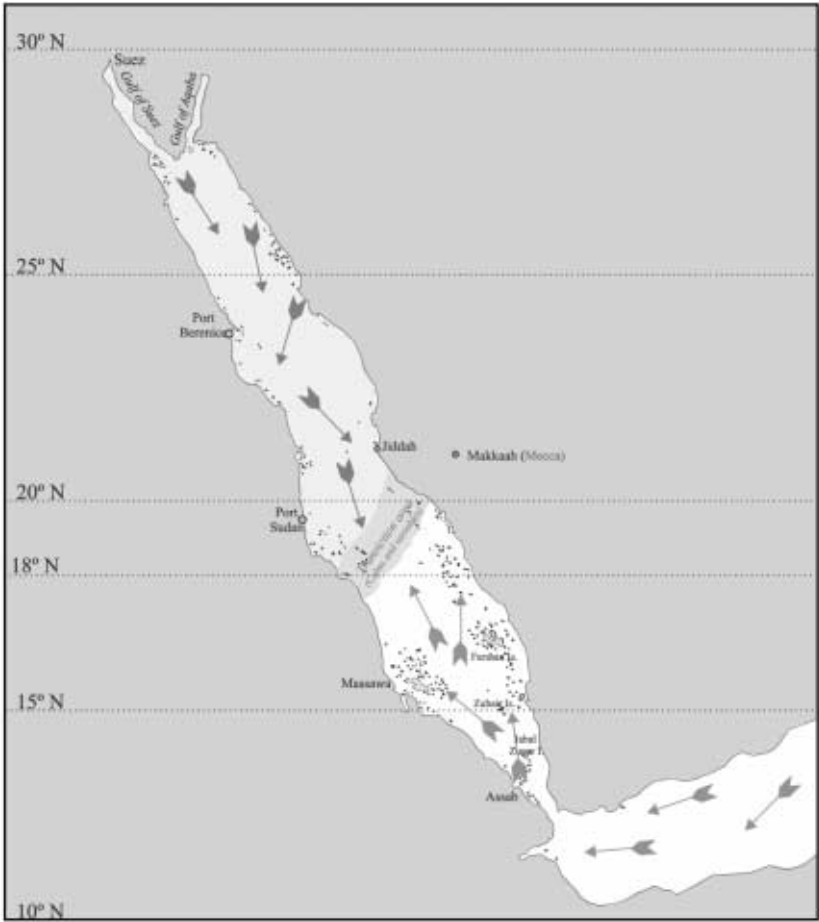
The system of land and sea breezes is noticeable near the coasts, and affects the direction of the wind. In the northern part of the Red Sea, there is a small diurnal change in wind direction. The wind follows slightly the movement of the sun, changing its normal north-north-westerly direction more to the east.

The currents in the area are directly affected by the monsoon winds. The effect of the northeast monsoon is to produce a west-going current in the Gulf of Aden, resulting in a flow of water up the Red Sea. The southwest monsoon produces a reversed effect, which draws water from the Red Sea.

On account of the general trend of the winds north of 18° N, which is northwest, the northeast monsoon effect on the current in this area is weakened by the contrary wind. On the other way the effect of the southwest monsoon is reinforced all along its period of influence.

In any circumstances, the rate of the current is low in the main modern shipping track, which is the middle of the channel, and does not exceed normally one knot.

Near islands and reefs, and along the coasts, the currents are variable in direction and rate, and in all areas are formed eddies, which oppose the monsoon influence.

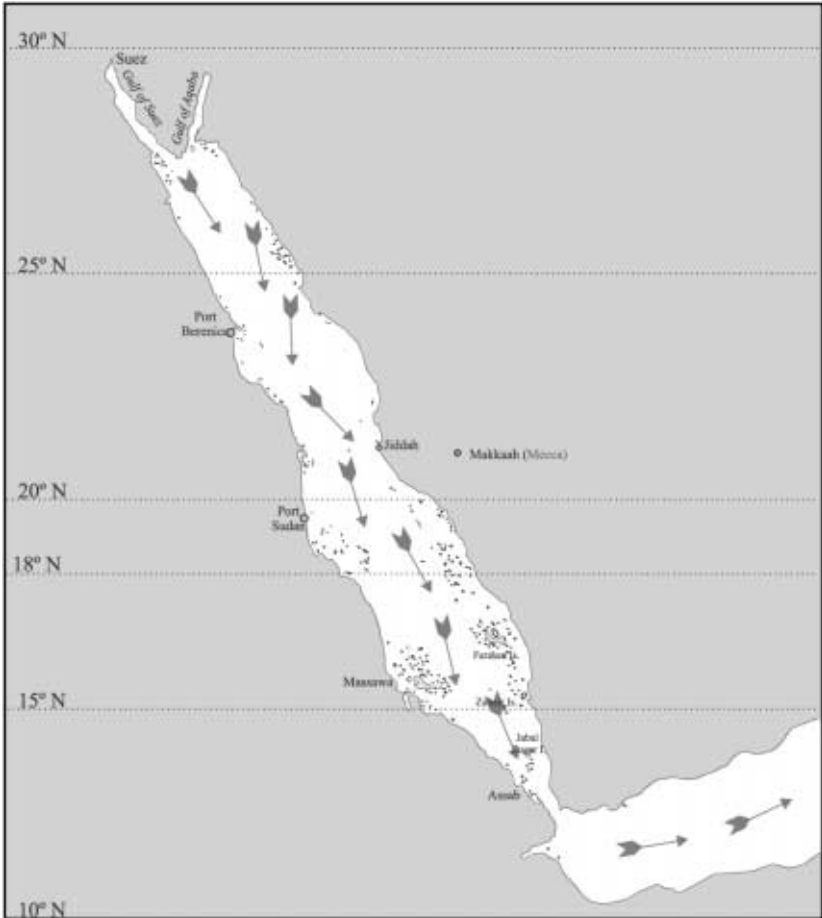


*Fig. 6 – Winds in the Red Sea. October to April*

### **Other physical conditions**

Indian Ocean tide did not enter the Red Sea, where a local oscillatory tide, of semi-diurnal type is developed. The range is from 0.60 to 0.90 meters and it decreases from the extremes north and south to the central area, where near Suakin and Jiddah there is no appreciable semi-diurnal tide.

The southern part of the Red Sea is considered one of the hottest areas in the world. Sailing southwards, during the period of the southwest monsoon, when the wind in all the area is northwest, is a terrible experience, because it follows the movement of the ship.



**Fig. 7** – Winds in the Red Sea. May to September

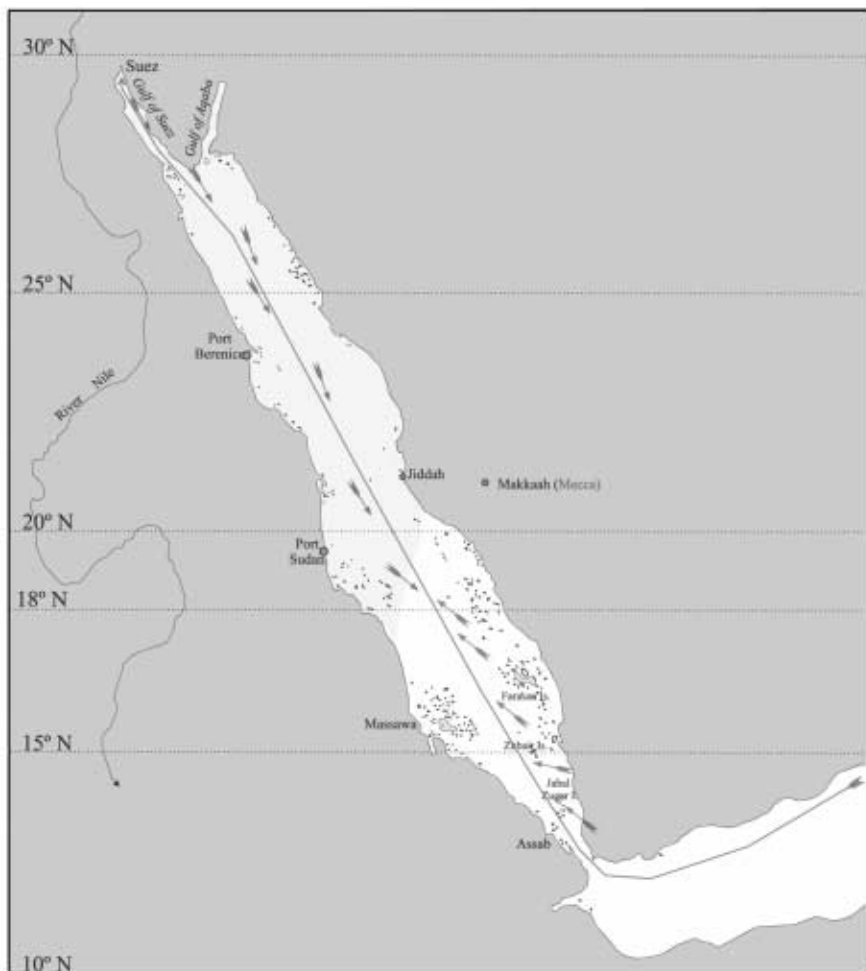
Humidity is relatively low in winter. In the rest of the year, over the sea, varies between 73% in January to 80% in June.

The sky is cloudless at any time of the year and the precipitation is very low in all areas, being the summer months usually completely dry.

Visibility is generally good, being often reduced by haze and sandstorms.

A good report of wind and other conditions in this area is given by the log of a Portuguese Navy frigate that in 1939 sailed to the north through the Red Sea<sup>41</sup>. As the observations aboard naval vessels are

<sup>41</sup> *Diário Náutico do Aviso de 1.ª Classe Bartolomeu Dias*, beginning in the first of October 1939 and ending at the 16th June 1940. Belongs to the Library of the author.



*Fig. 8* – Winds observed in the Red Sea, in February, aboard a Portuguese Navy frigate in 1939/40

always very reliable, it is interesting to check the wind information contained in the log, from which we give a brief summary.

The entrance of the Red Sea occurred on the 12<sup>th</sup> of February. The ship sailed in the mid channel, and the wind was constant from south-southeast to east-southeast, till roughly the 17<sup>th</sup> parallel of latitude. It changed abruptly to the northeast, and after 3 hours to the north-northwest, where it stayed till the arrival in Port Ibrahim. (see fig. 8) The strength of the wind was between two to five Beaufort.

From this statement we conclude that the wind direction is in accordance with the theory, because the month of February corresponds to the period of the northeast monsoon, which has its counterpart in the Red Sea as a southeast wind, which blows till roughly the 18th parallel.

## Navigation in the Red Sea

We can understand now, that during the times of rowing and sailing ships, the best procedure for sailing in this area is as follows:

- Big ships can come during the southwest monsoon, from the extreme north of the sea, from Suez for example, without any problem, sailing in the mid channel, with a following wind till the straits of Bab al Mandab and to India. During the northeast monsoon period, they can sail till Port Sudan or Jeddah easily. South of the 18<sup>th</sup> parallel contrary southerly (mainly south-easterly) winds are predominant, so big ships should wait in these harbours.
- For sailing against the wind, which is the predominant situation if going north, to the north of 18° N, the only possible procedure, owing to the width of the middle channel, which is not sufficient for tacking safely in waters surrounded by shoals, the best procedure is to sail by day along the coast. The progress will be made by sailing and rowing, with a man at the bow to look for the depth, which is very well recognized on account of the clearness of the water. The anchorage by night is useful for not losing ground upwind, and is possible because the shoals and islands give good shelter. It is also necessary because it is not possible to sail by night, because the shoals cannot be seen.
- This procedure can only be performed with small vessels, being the *gelvas* referred by Portuguese and other texts, the most appropriate craft for the area.
- On account of this, it is no question of sailing north of 18° N with a big vessel, which has no draft to take shelter and to navigate among shoals, and has no sailing qualities to tack upwind in a relatively narrow channel. Nevertheless, galleys of shoal draft could sail in this area, but we can imagine the quantity of water needed for the rowers of a big ship, who were permanently sweating, with the surrounding 40 to 50 degrees Celsius temperatures!

The best evidence of sailing in those waters in modern times, is given by the small cruising sailing boats that come from the Indian Ocean to Europe and choose the Red Sea instead of the Cape of Good Hope route. Their low powered motors can represent the oars of ancient craft, and although their sails are much more efficient, their struggle upwind is remembered for ever among their family, friends and also cruising community, because their reports are frequently published in sailing magazines.

From one of the last reports of a voyage made by a Norwegian sailor in 1998, we quote from his introduction to the article published in a sailing magazine: «I have sailed more than 80.000 miles and consider myself an experienced sailor. During 12 years spent circumnavigating the globe, I have fought fog, cold and stormy weather: [and goes on describing the bad things that happened to him] But when I reached the Red Sea, I failed the test. And I am ready to admit that I feel awful for having risked both boat and crew in this most devilish body of water».

Let us give a brief summary of his experience:

- As he entered the Red Sea in March, the first half of 600 miles, were with the southeast following wind.
- But after reaching the parallel of roughly 18°N, the wind became on the nose, blowing from 30 to 35 knots.
- The voyage continued with the boat tacking, and loosing permanently sails, that were changed continuously.
- The motor was used and many days were spent anchored waiting for a lull on the wind.
- The wind has never been favourable, and the last two hundred miles, before Suez, were sailed in two weeks.

And this man had radio communications, GPS, accurate charts, a strong fibreglass boat, stainless steel fittings, reasonable powerful motor, polyester sails, etc. You can imagine, dear ladies and gentleman, a *gelba* full of pepper, with the hull made of stitched pieces of coconut wood, propelled by sails or oars, and only with a pilot checking the Pole Star with his kamal.

So, the Red Sea is really a problem for sailors who intend to go north. And we think that historians understand this, but sometimes it seems that they do not give it enough attention.

## João de Castro's account of the Portuguese incursion to Suez in 1540

Before finishing, we would like to give the best reported example of navigation in the Red Sea till the sixteenth century, and the first hydrographical survey of the area, made by a Portuguese sailor who unbelievably had time to practice hydrographical work, although he was involved in a very complex naval operation.

As all of us know, D. João de Castro was the captain of one of the ships of the fleet of the Governor of *Estado da Índia*, D. Estevão da Gama, who among other important missions, intended to attack and destroy the Turkish fleet in Suez<sup>42</sup>.

Rowing and sailing ships composed the fleet. According to D. João de Castro they were 3 *galíotas*, 8 *caturs* and 54 *fustas*. We think that other big sailing ships, like *naus* and *galeões*, were included. The extract of one of the charts included in the *Roteiro do mar Roxo*<sup>43</sup>, shows, in Annex V, a sample of the fleet, where we recognize the predominance of sailing ships with auxiliary oar propulsion.

From the sketch of the route followed by the fleet represented in Annex IV, from the report of D. João de Castro and also having in mind the physical conditions of the area, we can say the following:

- The voyage upwind began in *Maçúá*, where the big sailing ships were left, which is the only possible decision, because these ships could not make the voyage.
- From *Maçúá* to the north, the wind was always from the northern quadrants (black arrows), except during three days in three very short periods (grey arrows).
- The wind, according to Castro, was sometimes very strong, accompanied with rough seas.
- The fleet anchored practically all nights, sometimes the ships were tied to rocks. The ships used the oars frequently, although the sails were used sometimes.
- Sometimes the anchorage was maintained for longer periods, and occasionally was necessary to anchor during the day, to take shelter from the wind and seas.

<sup>42</sup> See *Roteiro do Mar Roxo de Dom João de Castro*, ed. Luís de Albuquerque, Lisboa, Inapa, 1991.

<sup>43</sup> *Idem*, fac-simile of «Tavoa das Portas do Estreito».

- The voyage was always made among the reefs that were near the coast, because it was impossible to navigate in the open seas, due to the frequent need of protection against the head winds and seas. This shelter was only possible near the islands and shoals. Castro himself recognizes this.
- The operation was aborted, because people that travelled along the coast by camel had warned the Turks of the progress of the fleet. It is very interesting to recognize how different the situation is, compared with the West African coast, where caravels won the race against camels.
- The voyage of 700 miles made with head winds, took 67 days, which means 11 miles per day.
- The voyage of 500 miles from the straits to Suakin, made with favourable winds, took 23 days, or 21 miles per day.
- The total voyage inside the Red Sea, 1200 miles, took 90 days, or 13 miles per day. The same distance could be covered in 13 to 15 days with favourable winds.

## Conclusions

From all that has been said above and according mainly to nautical criteria, we can say:

- The southern half of the Red Sea, as it is affected by the monsoons, can be integrated in the northern Indian Ocean navigable area. In consequence, the harbours of *Massuá*, *Suakin* and even *Jidah* were excellent for long distance trade where big sailing ships could call.
- The northern half, with its permanent contrary winds, is only suitable for small craft, like the *gelbas*. Big sailing ships were even built in Suez and brought to Jeddah, *Suakin*, or other southern harbours, but they will not return to the north.
- The existence of harbours in the northern half is mainly due to the ability of this part of the sea to permit southern bound travel. So the *gelvas* can come south with cargo.
- The transit to the north from the south limit of north wind (Jeddah for example), can take up to 60 to 70 days.
- The transit to the north using the land route can take little less than that, so the land route was the main option, as it is recognized for

example by Kamerer and other authors<sup>44</sup>. Nevertheless the sea route was also used, and one of the reasons can be the need to return the boats to the northern harbours in a profitable way.

- The navigation in a NE/SW direction was possible and fast with a sailing boat, because it will be made with a beam wind. So, and for example, a transport of cargo from Leuké Komé to Berenice will be relatively fast and comfortable. In Berenice, the goods could go to Cairo by the existing land route; the same procedure could be used from Jeddah to Leuké Komé. Other transversal crossings could be performed.
- The limitations imposed by the physical conditions of the Red Sea originated an enormous increase of the cost of transport, on account of the transshipment of goods to small boats or camels. It is known the incredible amount of taxes paid by the caravans along their routes, and also the enormous quantity of camels employed to transport the cargo equivalent to an average cargo sailing ship. On account of this, another reason for the use of sea transport from Jeddah for example, to the north, was that it probably was cheaper, in spite of the conditions involved, with the continuous moisture, heavy movement of the boat, and elevated risk of loss, although the land route had also other similar problems.

Finally we can say that the Red Sea has been, till the epoch of steam ships and the opening of Suez Canal, more an obstacle than a means of communication from east to west.

---

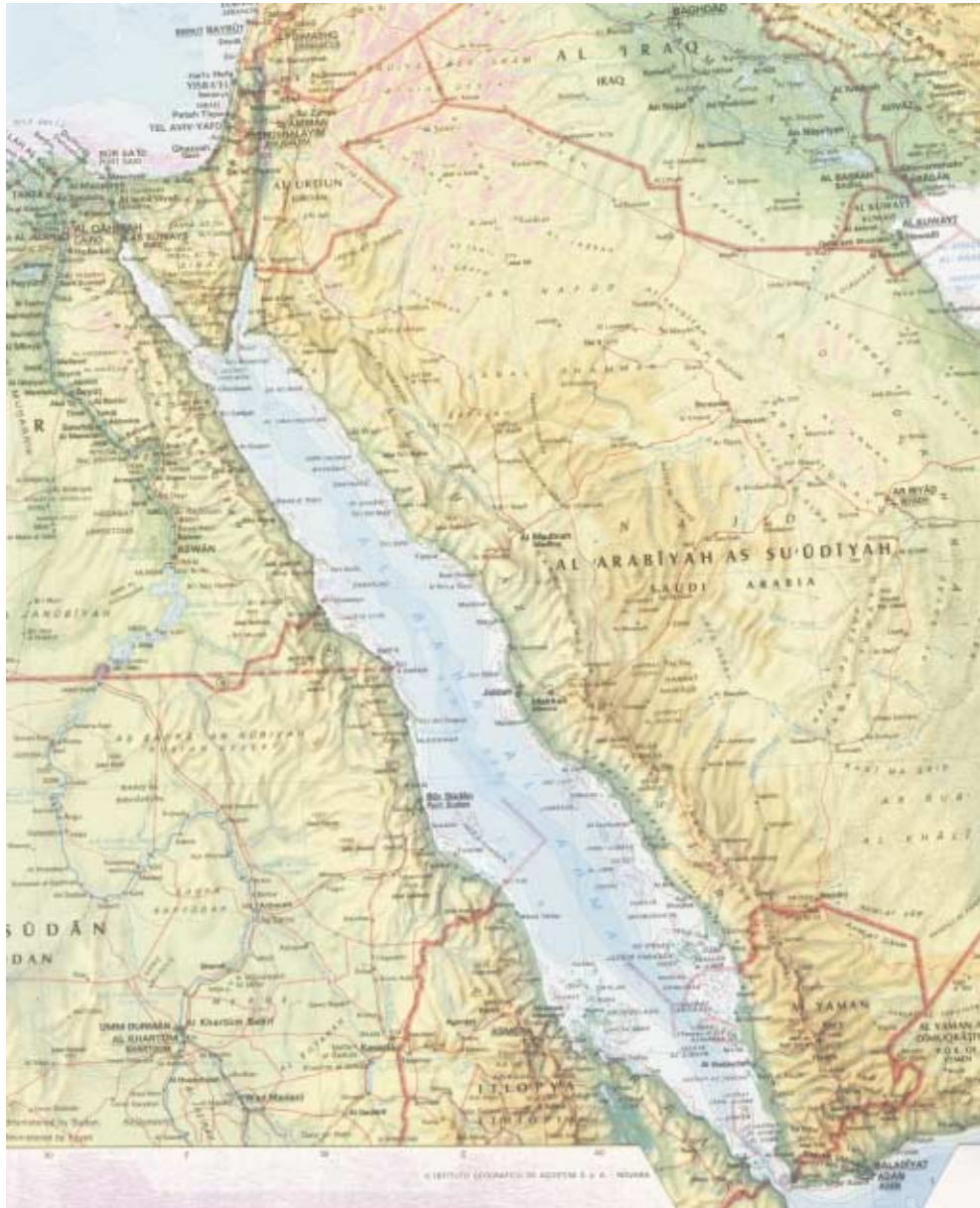
<sup>44</sup>See Carmen Radulet, Luís Filipe Thomaz, «Fontes Italianas para a História dos Portugueses no Índico», in *Mare Liberum*, n.º 19-20, Lisboa, Comissão Nacional para as Comemorações dos Descobrimentos Portugueses, 2000. The notes of Luís Filipe Thomaz give a great amount of references to this subject. See also Albert Kammerer, *La Mer Rouge l'Abyssinie et l'Arabie aux XVI et XVI Siècles et la Cartographie des Portulans du Monde Oriental*, Le Caire, Société Royale de Géographie d'Égypte, 1942. From the Prologue II. – *Les Routes*, we quote this important statement: – «... la navigation sur ses eaux était d'une difficulté extrême pour les fragiles embarcations de l'antiquité: pendant de longs mois, les vents et la température torride entravaient la remontée vers le nord: la mer elle même, quoique parsemée d'ilots et d'échancrures, n'offraient au navigateur que de rares et précaires abris. Au nord d'Aden, il trouvait plutôt des rades de fortune que des ports: aucun grand marché ou emporium digne de ce nom. En conséquence, le commerce ne pouvant suivre la mer jusqu'au bout et obligé toujours d'atterrir quelque part, se décidait à prendre, en un endroit quelconque, soit sur la côte orientale, soit sur la côte occidentale, la voie de terre.».

And if the monsoon regime affected all the area, permitting big ships to go from India to the Gulf of Suez, a single transshipment for canal barges would be enough.

Another final and interesting conclusion is that, if the Red Sea was navigable till Suez by big sailing ships, the Cape of Good Hope route probably would have not been profitable, and we would not be here, enjoying the company of the Goanese Academic community, of the congressists of so many nations, and of the wonderful people that is out there in this spicy territory.

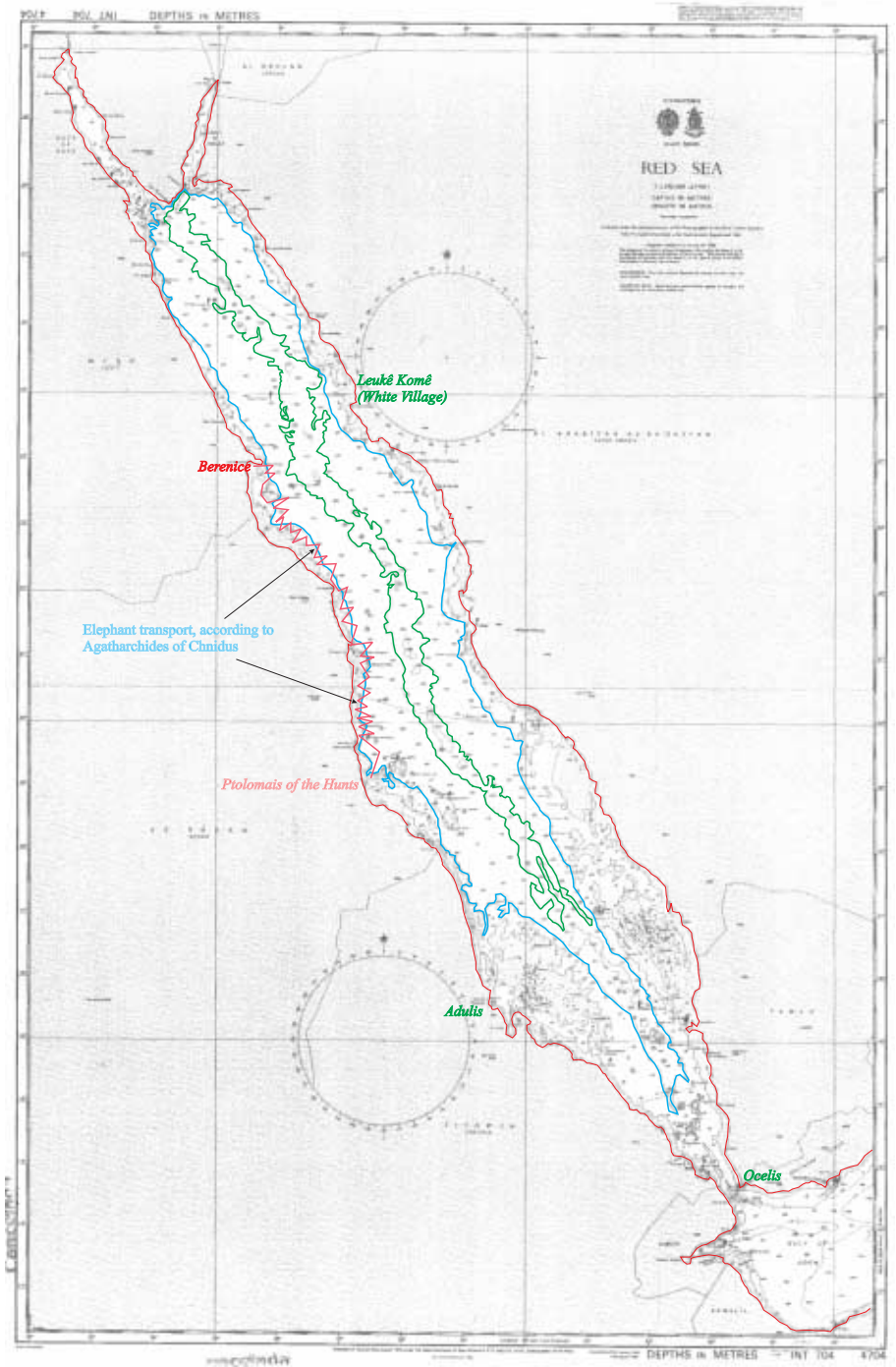
Annex I

The Red Sea. Physical conditions



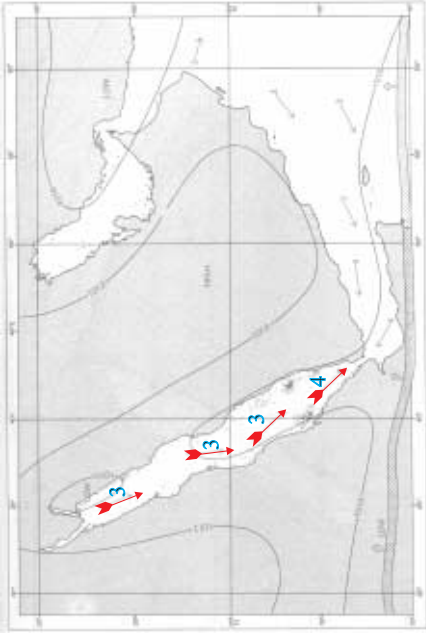
## Annex II

### Hidrographical chart of the Red Sea

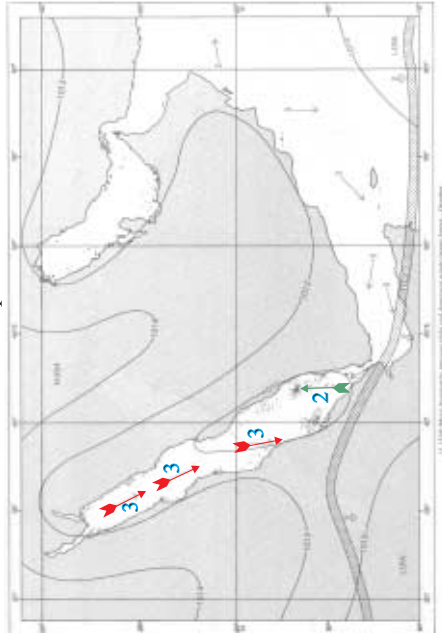


Annex III

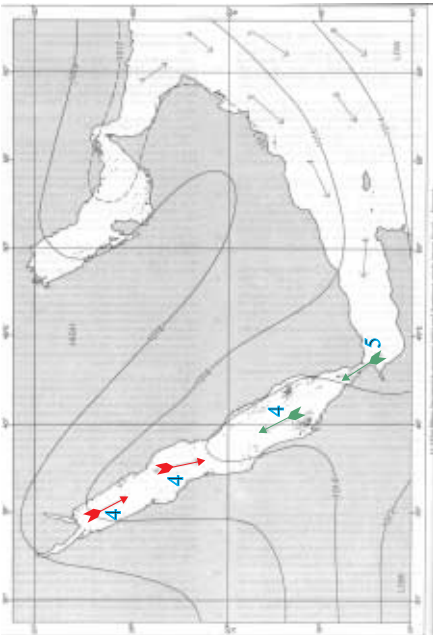
Average winds and its direction and force



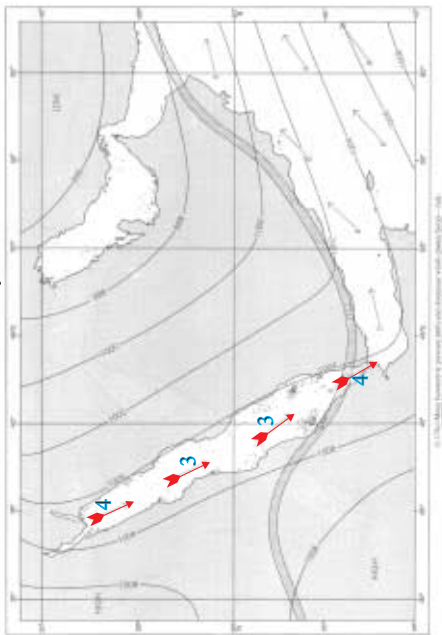
April



October



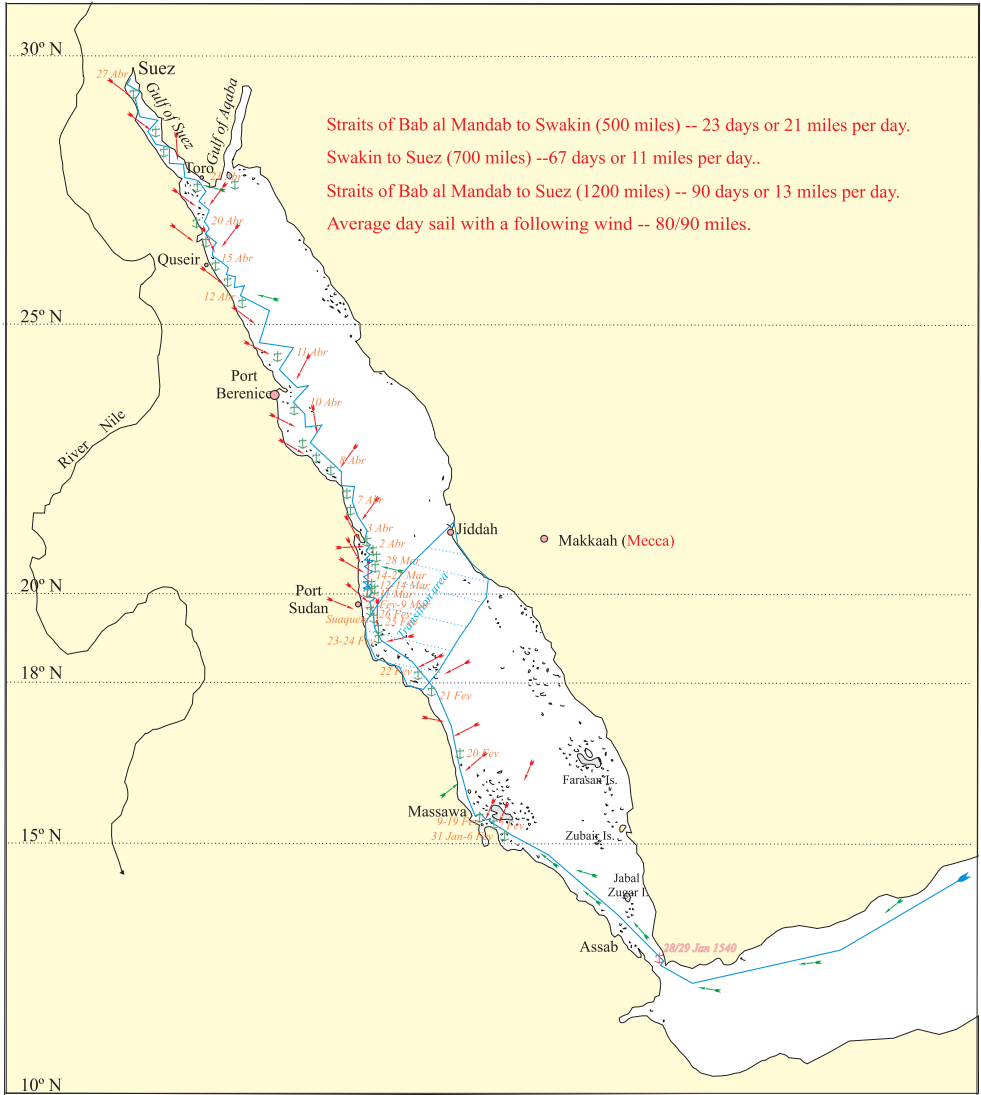
January



July

## Annex IV

### Track of D. Estêvão da Gama's fleet in the Red Sea in 1541



Annex V

Part of Estêvão da Gama's fleet according with the  
*Roteiro do Mar Roxo*

