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ADRIATIC SEA ROUTES FROM THE ANTIQUITY TO THE EARLY MODERN AGE

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This paper presents the key results of the author’s several-decades-long investigations regarding navigation in the Adriatic from ancient history to the first centuries of modern history. The presented conclusions are corroborated by the latest historical sources, unknown in earlier literature, while relevant literature is indicated to provide further details on particular issues.

Key words: Adriatic, Sea Routes, Antiquity, Middle Age, Early Modern Age, wind, ship, navigation

From Antiquity to the Middle Ages, sailing ships only had square sails at their disposal. With the square rig, winds which were blowing in the direction of navigation, so-called tailwinds, could be used. By easing the left sheet and pulling the right one, and vice versa, certain lateral winds could also be used. In addition, the art of navigation was not so developed: the seamen of the Middle Ages had only just started to use the compass, pilots were still using stern ors (the classical steering wheel only started to be used in the Middle Ages), and captains lacked instruments crucial for navigation on their ships. Moreover, the level of education of seamen was exceptionally low. However, despite all this, people still navigated. Of course, if the sea was calm, that is, if there was no wind, ships could be propelled by rowers. However, only naval ships used rowers usually, because rowers, many of which were needed, were not economically feasible for merchant shipping. Therefore ships, anchored safely in a bay, preferred to wait for favourable winds to be able to continue sailing, which meant that travelling certain distances, because of calm seas or unfavourable winds, often lasted much longer than shipowners, captains or maritime traders wanted. With the first centuries of the Modern Age, and the
Fig. 1. The depths of the Adriatic Sea, as shown by the results of modern investigations, are optimal for the navigation of the most varied vessels ([Peljar I. Jadransko more – Istočna olula, Hrvatski hidrografski institut, Split, 1999, B-I, 9]). Over the last two thousand years, the depths of the eastern Adriatic coast have increased by an average of two metres, while they have decreased by the same amount on the western coast. It is important to take into account here the extension of the western coast due to deposits from Italian rivers (W. H. Smyth, 1854, 34-48).

Fig. 2. Adriatic Sea currents according to investigations published as a special map by the French Dépôt Général de la Marine in Paris in 1855. Standard navigation routes were added which are used almost as they have been used over the last two thousand years (M. Kozličić, 2006, 27; W. H. Smyth, 1854, 165-166).

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1 M. Kozličić, 1993.
2 M. Kozličić, 2000a, 49-124. In addition, footnotes present excerpts of the relevant historical sources, mostly of the 19th century, as certain sum of the millennia experience, including those of 19th century scientific marine research. These are the confirmation of previous statements. Again, in the body text there are lapidary conclusions of the decades’ research by the author of this text. The part of these results could be found in other papers by the same author.
4 A. Botrić, 1964, 517-544.
5 M. Kozličić, 1995.
6 Pilot, 1861, 7-9: “The name bora is generally given in the Adriatic to winds between east-north-east and north-north-east. It is very dangerous, and greatly feared, as much for the suddenness of the attack as for its extreme violence; it generally, particularly in winter, blows with the greatest strength after a strong gale from south-east, and is most persistent and violent towards the eastern coast. In general direction being across the Adriatic, the limited breadth of this sea is certainly one of the causes of the risk attending it, for a vessel unable to keep any longer under sail, is rapidly driven on the coast of Italy, where there is scarcely a good place of shelter for large vessels. // Vessels generally let fly everything to receive the first blast, then bear up to the southward for any port they can fetch; or remain under bare poles till it is exhausted. // Off the Gulf of Cattaro the bora, although less violent, sometimes renders it impossible for vessels to carry any sail, even when overtaken at a short distance from land; very often in this...
Fig. 3. Adriatic Sea currents according to the results of modern investigations for the summer (upper image) and winter (lower image) seasons, taken from Peljar I. Jadran-skom more – Istočna obala, Hrvatski hidrografski institut, Split, 1999, B-I, 11. If this figure is compared to Figure 2, it can be observed that the preferred pattern of sea currents in Figure 2 is the summer pattern with which the sea routes are therefore associated. This is consistent with the two-millennia-old tradition that navigation was rare in the colder part of the year (from the middle of autumn, through winter and to the middle of spring) on account of the extremely unfavourable weather conditions in the Adriatic (almost constant shifts between the bora and sirocco winds) (PILOT, 1880, 6-10).

part of the Adriatic, on standing out at once, the wind will be found more moderate, and a vessel may then run for a shelter or keep at sea. // In winter, this wind is to be feared especially in Vrulja bay near Marusa, at the mouth of the Neretva, and off the valley of Giudiana; it is also usually exceedingly fierce between Zuri island and Plansa point, from the high land in the vicinity of Sebenico. // In the channels of the Quarnero, and at the entrance of this gulf, too great precaution cannot be taken; the bora here rushes down from the whole like of the Julian Alps with such irresistible fury that it is not only prejudicial to navigation, but extremely so to agriculture, which has in some parts been consequently abandoned; the chief part of the maritime trade of Fiume can only be carried on during the fine season, and the otherwise eligible haven and arsenal of Porto Re are almost useless. Whole districts are rendered uninhabitable, and as not a bush nor a blade of grass can grow on the shores most exposed, local craft usually anchor off the parts where vegetation is most abundant. When Mount Velebit is capped by white clouds, a vessel should not venture into the Quarnero. // The bora sometimes obliges vessels anchored in Trieste road to seek shelter under Salvore point and along the coast of Istria. It is the more dangerous in the channels because it generally takes vessels on the beam and there is but little room; the mariner should at all times keep under the weather island, in order to be able to bear up. // It gives sufficient notice of its approach to an attentive observer to allow of precautions being taken. When small dark clouds are seen rising from the mountains of the eastern coast of the Adriatic and taking irregular directions, and large white, round, isolated clouds to alight on the tops of the high mountains of Dalmatia, a bora may be shortly expected, which will continue to blow until the former disappear, and the latter no longer adhere to the land. As a
general rule, the clouds only leave the sides of the mountains when the wind loses its force and is about to cease. // The barometer, too, is no safe guide, as although the fall of the mercury does occasionally correspond with the violence of the coming wind, yet it must not be depended upon, - indeed it generally rises during a strong gale from this quarter. // The coming on of the heaviest boraas are occasionally announced, some hours before hand, by a dense black cloud on the horizon in the north-east, with light fleecy clouds above it, a rather lurid sky, and an unusual stillness of the atmosphere. The general direction is between north and north-east, and the ordinary continuance about fifteen or twenty hours, with heavy squalls, thunder,
more frequent use of the latin rig, navigation was facilitated by the fact that winds unsuitable for the square rig could be used, and that the ship’s steering-wheel system had been perfected. However, even then the square rig prevailed, which meant that the lateen rig only served as an auxiliary rig. The turning point only occurred at the end of the 18th, and in particular in the 19th century. However, before this time, many other features of navigation were improved, such as navigational instruments, construction quality, the steering system, the art of navigation, and so on. A certain regularity can be observed in all the above in surviving historical sources.

First, ships most often sailed within reach of the coast (coastal navigation), because there was neither a sufficient number of lighthouses nor an awareness that the issue should be systematically addressed to facilitate navigation (this was done in the Adriatic region as late as the 19th century).

Second, such navigation offered relative safety to the ship, crew and cargo, and the practical part of navigation was thus facilitated, for without additional instruments one could sail, before the winds reached gale force, from north-west toward the south-east, and vice versa. Of course, other winds were also used, like the bora, scirocco, mistral (the south-easterly wind),7 were used instead, i.e. as long as the ship could be sailed in the desired direction. If not, regardless of the wind, a safe haven would be sought in the nearest bay until the strength of the wind decreased to an acceptable level, or until a more favourable wind for navigating started blowing.

Fourth, because these winds were the major driving forces along the eastern coast of the Adriatic Sea, two basic anchorages were established very early on: one in the north-west off the western coast of Istrija (Poreč - Rovinj), and another in the south-east (the Mljet Channel and also the waters between the mainland and the Elaphiti archipelago off Dubrovnik).8 There, protected by the coast, ships would wait for a favourable wind or would sail toward the north-west or from the Adriatic toward the southeast and south. These two points were at the same time the beginning (the waters off Dubrovnik) and the end (the waters off Pula and Poreč) of the eastern Adriatic islands along which ships sailed, and which provided at least some kind of protection to ships which were then unsafe both in terms of navigation and construction. Of course, the waters off Pula and Poreč provided for navigation across the sea toward Venice (east-west), Ancona (north-south) and also Ravenna (north-east to south-west).

Fifth, apart from such coastal navigation, ships also traversed the Adriatic from the east coast to the west. Such navigation regularly occurred on those routes where one could sail on cardinal (east-west, west-east, north-south, south-north) and intercardinal (north-west to south-east, south-east to north-west, north-east to south-west, and southwest to north-east) routes. For such navigation, it sufficed to know one cardinal direction and the direction from which the strongest and, for that journey, most favourable wind was blowing for the destination to be reached. Of course, all such voyages, in particular those across the Adriatic, were limited to daylight navigation, so that the harbours to which seamen sailed were those reachable within a day of sailing. Such routes were typically the following: from Rovinj or Poreč to Venice, Pula - Ancona or Ravenna, Zadar - Dugi Otok - Ancona, the islands in the waters off Split - Vis - Palagruža (Diomed’s Island) - Gargano, Dubrovnik - Brindisi or Bari, Valona - Otranto.9 The following day, the ship would sail to another nearby harbour, navigating along the coast. Sometimes, for example, to enter the Venetian lagoons, maritime pilots were required and boarded the ship in Rovinj or Poreč, and got off when they returned to the starting port.

Sixth, meteorological, oceanographic, hydrographic and other features of the Adriatic Sea, in terms of lighting, and rain at intervals. The bora most feared is that which blows in sudden gusts for three days, subsides, and then returns for three days longer. // 17 It generally dispels any hovering clouds or fog, and when it blows with great force, the weather is very clear; a few small round clouds moving rapidly being alone visible: if the atmosphere should not be cleared after 24 hours, the wind will probably continue a long time; or a south-easter will spring up. In winter, it is frequently accompanied by thick fog and snow, causing an excessive coldness. // It usually comes on at the rising or setting of the sun, alternating, frequently ceasing, at noon or at daybreak, but should it continue in force at these periods, it may be expected to last a considerable time. // In winter, it is most persistent, sometimes blowing for one, fifteen or thirty days, with short intervals of calm, and is then almost impossible to make sail. // In summer, it seldom or never lasts longer than three days, and is then usually moderate; if it increases in strength, it is generally for a short time only, and after a great deal of rain; it has, however, some difficulty in rising as long as the mountains of the eastern coast are very wet with rain; when it then occurs it is of short duration, and the force is generally in proportion to the dryness of the land. March, the end of May, and especially the early part of June, seldom pass without a gale. // The bora often succeeds a slight rain following a long drought; should it not blow in such case, south-east winds may be expected. Cfr. SEGELHANDBUCH, 1893, 20-23.

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2 Some fifty prominent islands situated near both Adriatic coasts: Lido in front of the Venetian lagoons, Sveti Nikola off Poreč, Sveti Ivan off Rovinj, the Brajuni Islands, Sveti Jerolim off Pula, the islands surrounding the Kamenjak promontory, Unije, Cres and Lošinj, Krk, Rab, Ilovik, Premuda, I. Silba, Olib, Molat, Dugi otok, Pag, Vir, Sestrunj, Uglijan, Pašman, Murter, Kaprije, Žirje, Zlarin, Veli and Mali Drvenik, Šolta, Brač, Hvar, Sćedro, Vis, Bševo, Jabuka, Svetac, Palagruža, the Tremtini Islands, Lastovo, Korčula, the Pelješac peninsula, Mljet, Jakljan, Šipan, Lopud, Koločep, Đaksa, Lokrum, the reefs off Cavtat, the Molunat peninsula, Mamula at the entrance to the Bay of Kotor, and Sveti Nikola off Budva.

3 Third, when the two dominant winds in the Adriatic Sea, the bora (the most frequent north-easterly wind) and the scirocco (the south-easterly wind),7 were used for navigation, one could sail, before the winds reached gale force, from north-west toward the south-east, and vice versa. Of course, other winds were also used, like the tramontane, mistral, levante and ponente, as long as they were useful, i.e. as long as the ship could be sailed in the desired direction. If not, regardless of the wind, a safe haven would be sought in the nearest bay until the strength of the wind decreased to an acceptable level, or until a more favourable wind for navigating started blowing.
weather, conditioned navigation to take place at more favourable times of the year, i.e. in the period from midspring to mid-autumn. Seamen also sailed at less favourable times of the year, but due to the weak construction of ships and insufficient port infrastructure throughout the Adriatic during Antiquity, the Middle Ages and the first centuries of the Modern Age, such voyages rarely occurred and were often dangerous, with the result that seamen, if possible, avoided them.  

Antique and mediaeval historical sources offer scarce specific data on the above. However, if these data are compared to Early Modern Age data, when such voyages generally still had the same qualities, it can produce high-quality and well-founded results.

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SAŽETAK

JADRANSKE PLOVIDBENE RUTE OD STAROGA DO PRVIH STOLJEĆA NOVOGA VIJEKA

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Brodovlje od staroga do srednjega vijeka i tadašnje pojave latinskog jedra imalo je na raspolaganju, ako su to bili jedrenjaci, jedino križna jedra. Njima se moglo iskoristiti vjetrove koji su puhali u pravcu plovidbe, tzv. krmene vjetrove, uz činjenicu da se popuštanjem lijeve, a natezanjem desne škote i obratno, moglo iskoristiti i dio bočnih vjetrova. K tome i umijeće plovidbe nije bilo preveliko, kompas je u potrebi tek od srednjeg vijeka, a kornilari se kremnim veslima. Dakako, ako bi bila tišina na moru, tj. vrijeme bez vjetra, brod se moglo pokretati i uz pomoć vesla, no to se obično činilo kod ratnog brodova jer veslački kompleks, uvijek ljudstvom prilično brojan, za trgovačku plovidbu redovito ekonomski nije bio isplativ. Zato se radije, u zaštiti kakve uvale, čekalo povoljan vjetar za nastavak plovidbe, pa je prevlakivanje pojedinih relacija zbog tišina ili nepovoljnih vjetrova često trajalo puno duže nego što su to brodovlasnici, kapetani ili pomorski trgovi čezeli. Do prvih stoljeća novoga vijeka, sve većom uporabom i latinskog jedra, plovidbe će biti učinjene činjenicom da se moglo koristiti za križno jedrilo neuporabljive vjetrove, a i sustav upravljanja brodom s pomoću kornila prilično se usavršio. No, čak i tada dominiraju križna jedra što znači da je latinsko jedro tek na razini ispolnjeni. Prekretica će biti tek od kraja 18. st., osobito u 19. st., ali će do tog vremena u pomorstvu mnogo toga biti bitno unaprijeđeno (npr. navigacijski instrumentarij, konstrukcijske kvalitete brodovlja, kornilarni kompleks, umijeće plovidbe, itd.).

U svemu navedenome, u očuvanim povijesnim izvorima, mogu se uočiti stanovite zakonomjernosti. Prvo, najčešće se plovilo u dohvatu obale (obalna plovidba), jer nije bilo dovoljno svjetionika niti svijesti da se njima treba sustavno pozabaviti te time olakšati plovidbu (to će na Jadranu biti učinjeno tek u 19. st.). Drugo, takvim plovidbama ostvarivala se relativna sigurnost broda, posade i tereta, a i praktični dio plovidbe bio je utoliko olakšan što se, bez dodatnih instrumentata, tek trebalo pratiti obalu u plovidbi JL-SZ ili SZ-JL. Pritom se iznimna množina otoća uz istočnu obalu Jadranja, kao niz vrlo prepoznatljivih orijentira, pokazala izvanredno korisnom u orijentacijskom pogledu, dakako ukoliko se to otoće i njegov položaj u geografskom prostoru poznavalo. Najstarije očuvane plovidbene karte s početka 14. st. o tome egzaktno svjedoče, ističući u prvi plan oko pedesetak markantnih otoka, u blizini obje jadranske obale: Lido ispred venetskih laguna, Sv. Nikole ispred Poreća, Sv. Ivan na pučini ispred Ruvinja, Brijune, Sv. Jerolim ispred Pule, otočje oko Kamenjaka, Unije, Cres s Lošinjem, Krk, Rab, Ilovik, Premudu, Ist,

O navedenome, stari i srednjovjekovni povijesni izvori daju malo konkretnih podataka. No, ukoliko ih se komparira s ranovinovjekovim, kada se plovdbi i dalje imaju većinom ista obilježja, mogu se postići kvalitete i ute- meljene znanstvene spoznaje.