

Jedan opis jadranskih struja iz 17. stoljeća

Godine 1663. objavio je Isaac Voss u Hagu *De motu marium et ventorum liber*. Djelo je ubrzo prevedeno na francuski (Pariz, 1665), a potom i na engleski jezik (London, 1677). Nedavno sam uspio doći do kopije ovog potonjeg prijevoda. Tekst sadrži opis strujanja u Jadranu, koji je nesumnjivo važan za razumijevanje razvoja jadranske oceanografije.

U prvom dijelu svoje rasprave Voss opisuje cirkulacijsku ćeliju u sjevernom Atlantiku, u kojoj strujanje slijedi smjer kazaljke na satu. Također izlaže vlastito objašnjenje te pojave, bazirano na privlačenju Sunca. Kružno gibanje smatra općim svojstvom mora i oceana, što podupire primjerom Jadrana (Voss, 1677, str. 45–46):

In the *Adriatick* Sea the Waters move along the Shores of *Dalmatia* and *Croatia*, even to the bottom of the Gulph of *Venice*. From thence by a contrary motion they wash the coast of *Italy* until they return to the place from whence they came.

Opis nedvosmisleno ukazuje na ciklonalnu, protusatnu strujnu ćeliju u Jadranskom moru. U nastavku teksta Voss (1677, str. 46–49) kružno gibanje uočava i u Sredozemnom moru:

Neither does it happen so only in the *Adriatick*, but likewise in all the *Mediterranean* Sea. For although the Currents of this Sea are not so discernable as the course of the Ocean, and that the Tides in many places are scarcely sensible, and are often intercepted by Land Winds; yet here also the case and manner of the Currents are found to be the same. Upon the Coast of *Mauritania* and *Numidia* the Seas flow from West to East, by reason of the entrance of the Ocean which in that place is contrary to the course of the Sun; as we have already made appear. But on the contrary on the opposit Coasts of *Italy*, *France* and *Spain* the Tides and Current set from East to West until they come to the *Streights* mouth where they meet the Ocean and there part of their Waters set outward; but the rest being repulsed bear down upon *Mauritania* & the succeeding Coasts, till by the force of the Ocean they accomplish their full circuit.

The same thing is also to be seen in the Eastern parts of the *Mediterranean* Sea, where it beats upon *Syria* and *Egypt*; for there also the floods wheele about in a circle though after another manner; the nature and constitution of the Sea it self so requiring. Although the *Mediterranean* Sea be seprated from the Ocean, and at a distance from the Torrid Zone, yet it is obnoxious to the same motions though smaller. For seeing it is not so far distant from the course of the Sun; as either the *Archipelage*, *Euxine*, *Caspian* or *Baltick* Seas, and reacheth a great deal farther from East to West; it is not to be thought strange that when the above named

Seas swell not with any sensible Tide; this should suffer at least some alteration from the vicinity of the Sun. It hath therefore a Current from East to West, and although that flood be not very conspicuous, it may be nevertheless gathered from this, that Ships sailing from *Syria* and *Egypt*, do somewhat sooner arrive at the *Streights* mouth, than such as set out from thence, can get to *Syria*. This Voyage would likewise be sooner performed, if upon the Coasts of *Numidia* and *Mauritania* they did not meet with the flood of the Ocean which retards their course. Hence it is manifest that the Current and Tide of the Western parts of the *Mediterranean* Sea is guided by the Ocean, and by it forced round in a Circle; but the Eastern part of the same, where the Ocean never or but very seldom reacheth in its course follows the Motion of the Sun; now though this Motion be contrary to the former, yet the same is the reason and manner of Circulation in both. The *Egyptian* Sea, for the most part setteth from East to West, and the *Pamphylian* on the other hand from West to East. The *Aegean* Sea in that part thereof which washeth *Asia* flows from North to South. But where it Beats *Macedonia* and *Thracia* it runs from South to North.

Iz ovog citata razabire se da Voss, kao i drugi autori tog vremena (Deacon, 1978), povezuje razmatranje struja te plime i oseke. Na jednom mjestu sasvim je eksplicitan (Voss, 1677, str. 56):

Seeing it is not only useful but even necessary for Navigators to know from what point of the compass towards the several Shores and Tracts of Land the daily Tides do set, which in the space of twenty four hours do flow twice, and as often ebb; we must not pass over the general rule to which these particular motions ought to be referred: for we must know that all the world over the diurnal Tides do follow the universal Currents of the Ocean whereof we have discoursed.

Premda tu vezu struja i morskih mijena Voss ne naglašava posebno u opisu Jadrana, iz tvrdnje da je to univerzalna pojava može se zaključiti da je anticipirao otkriće protusatnog kruženja poludnevnog plimnog vala na jadranskom šelfu.

Tko je bio Voss i u kojoj mjeri je njegov opis jadranskih struja izvoran? Iz dostupne, relativno kratke biografije (Anonymous, 1967) vidi se da je Isaac Voss (lat. Vossius) rođen 1618. godine u Leidenu kao sin jezikoslovca i teologa Gerharda J. Vossa. Očito pod očevim utjecajem razvio se u učenjaka, čovjeka knjige. Sredinom 17. stoljeća bio je knjižničar na dvoru švedske kraljice Kristine. U vrijeme njene abdikacije vratio se u Nizozemsku, a 1670. godine prešao je u Englesku. Tri godine kasnije postavljen je za kanonika u Windsoru. Tu je i umro, 1689. godine. Izdavao je i komentirao djela antičkih autora, pa su ga tako zainteresirali i geografi Skilak iz Karijande i Pomponije Mela. Uvidom u neke inozemne baze podataka utvrdio sam da je Voss objavljivao izvorna djela iz područja teologije, te da je pisao o glazbi i o prirodnim znanostima. U ovu posljednju kategoriju spada, dakako, i rasprava o gibanju

mora i vjetrovima. Do podataka o Jadranu za tu raspravu Voss je mogao doći (1) pregledom literature, (2) informiranjem kod pomoraca, ili (3) vlastitim opažanjem. U svojem tekstu na raznim mjestima spominje ranije autore (premda po imenu samo Teofrasta) kao i pomorce, ali nigdje terenski rad. Stoga se mogućnost da je sam vršio opažanja po svoj prilici može isključiti. Da bi se procijenilo koliko se Voss u opisu Jadrana oslanjao na prethodne autore, a koliko na informacije prikupljene neposredno od moreplovaca, trebat će proučiti tekstove u kojima se jadransko strujanje opisivalo od antičkih vremena do 17. stoljeća.

Literatura

- Anonymous (1967): Isaac Vossius or Voss, Webster's Biographical Dictionary. G. & C. Merriam, Springfield, p. 1530.
- Deacon M. B., Ed. (1978): Oceanography – Concepts and History. Dowden, Hutchinson and Ross, Stroudsburg, 394 pp.
- Voss I. (1677): A Treatise Concerning the Motion of the Seas and Winds. H. Brome, London, 189 pp.

Mirko Orlić

Minutes from the annual meeting of the Editorial Board of »Geofizika«

The meeting was held at the A. Mohorovičić Geophysical Institute in Zagreb on 15 April 1994, with the following agenda:

1. Report on Vol. 9
2. Financial report for the years 1992 and 1993
3. Acceptance of the manuscripts for Vol. 10 (1993)
4. Financial plan for the year 1994
5. A.O.B.

Dr. M. Herak opened the meeting informing the members of the Board of the activities since the last meeting.

A. Igrac presented the financial report which was unanimously accepted. The costs of issuing Vol. 9 were completely covered by the Ministry of Science, Technology and Informatics of the Republic of Croatia. The financing of Vol. 10 is also covered by the Ministry, while only half of the funds foreseen necessary for Vol. 11 are currently secured.

D. Herak informed the Board of the status of manuscripts submitted for publication in Vol. 10. It is to contain 4 original scientific papers and one short communication. The members of the Board agreed to the classification of papers as suggested by the reviewers, and formally accepted them for publication.

Davorika Herak