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COVID-19 impact on global maritime mobility

Leonardo M Millefiori # [1], Paolo Braca # [2], Dimitris Zissis [3 4], Giannis Spiliopoulos [4], Stefano Marano [5], Peter K Willett [6], Sandro Carniel [1]

Affiliations + expand

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Abstract

To prevent the outbreak of the Coronavirus disease (COVID-19), many countries around the world went into lockdown and imposed unprecedented containment measures. These restrictions progressively produced changes to social behavior and global mobility patterns, evidently disrupting social and economic activities. Here, using maritime traffic data collected via a global network of Automatic Identification System (AIS) receivers, we analyze the effects that the COVID-19 pandemic and containment measures had on the shipping industry, which accounts alone for more than 80% of the world trade. We rely on multiple data-driven maritime mobility indexes to quantitatively assess ship mobility in a given unit of time. The mobility analysis here presented has a worldwide extent and is based on the computation of: Cumulative Navigated Miles (CNM) of all ships reporting their position and navigational status via AIS, number of active and idle ships, and fleet average speed. To highlight significant changes in shipping routes and operational patterns, we also compute and compare global and local vessel density maps. We compare 2020 mobility levels to those of previous years assuming that an unchanged growth rate would have been achieved, if not for COVID-19. Following the outbreak, we find an unprecedented drop in maritime mobility, across all categories of commercial shipping. With few exceptions, a generally reduced activity is observable from March to June 2020, when the most severe restrictions were in force. We quantify a variation of mobility between -5.62 and -13.77% for container ships, between +2.28 and -3.32% for dry bulk, between -0.22 and -9.27% for wet bulk, and between -19.57 and -42.77% for passenger traffic. The presented study is unprecedented for the uniqueness and completeness of the employed AIS dataset, which comprises a trillion AIS messages broadcast worldwide by 50,000 ships, a figure that closely parallels the documented size of the world merchant fleet.

Conflict of interest statement

The authors declare no competing interests.

Figures

Figure 1 (a) Crude oil...

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Figure 5 Monthly CNM density difference between...

Figure 6 Monthly CNM density difference between...

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