#MarineData4Asia

Copernicus Marine data use cases from the Arabian Gulf

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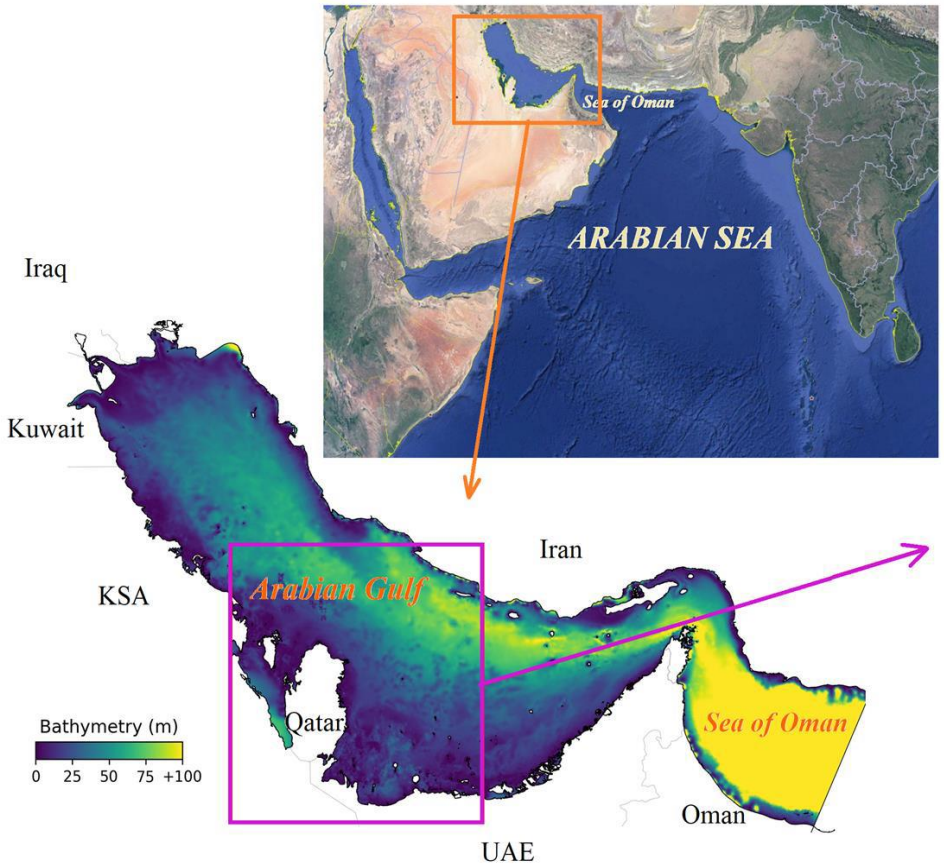
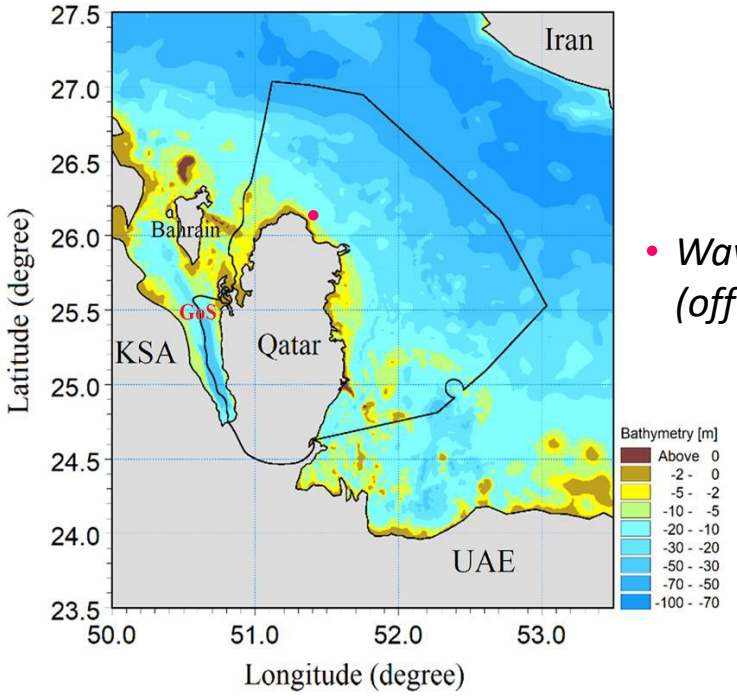
The Arabian Gulf and Qatar EEZ: Physical settings





- **Length across the basin: 980 km**
- **Max. width: 350 km**
- **Width of Strait of Hormuz: 56 km**
- **Average depth - 36 m**
- **Maximum depth - 100 m**

- *Wave measurement location (off Fuwairit)*

- **SST during summer: 23 – 33 °C**
- **SST during winter: 19 – 22 °C**
- **Salinity during summer: 36 – 46**
- **Salinity during winter: 38 – 46**

Studies on which Copernicus Marine data are used

Arabian Gulf

1. Role of shamal and easterly winds on the wave characteristics off Qatar, central Arabian Gulf (2021, *Ocean Engineering*)
2. Hitchhiking of encrusting organisms on floating marine debris along the west coast of Qatar, Arabian/Persian Gulf (2021, *Science of The Total Environment*)
3. Factors influencing the vertical distribution of microplastics in the beach sediments around the Ras Rakan Island, Qatar (2021, *Environmental Science and Pollution Research*)
4. Spatial distribution, structural characterization and weathering of tarmats along the west coast of Qatar (2020, *Marine Pollution Bulletin*)
5. Sources, spatial distribution and characteristics of marine litter along the west coast of Qatar (2020, *Marine Pollution Bulletin*)
6. A climatological overview of surface currents in the Arabian Gulf with special reference to the Exclusive Economic Zone of Qatar (Under review, *International Journal of Climatology*)

Mauritius

1. History of a disaster: A baseline assessment of the Wakashio oil spill on the coast of Mauritius, Indian Ocean (2022, *Marine Pollution Bulletin*)

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Copernicus Marine use cases

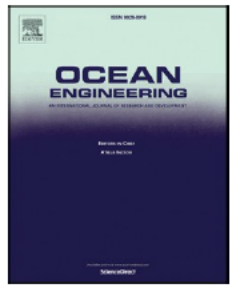
Case 1:

Ocean Engineering 236 (2021) 109457

Contents lists available at ScienceDirect

Ocean Engineering

journal homepage: www.elsevier.com/locate/oceaneng



Role of shamal and easterly winds on the wave characteristics off Qatar, central Arabian Gulf

V.M. Aboobacker [a], S.V. Samiksha [b], S. Veerasingam [a], Ebrahim M.A.S. Al-Ansari [a], P. Vethamony [a,*]

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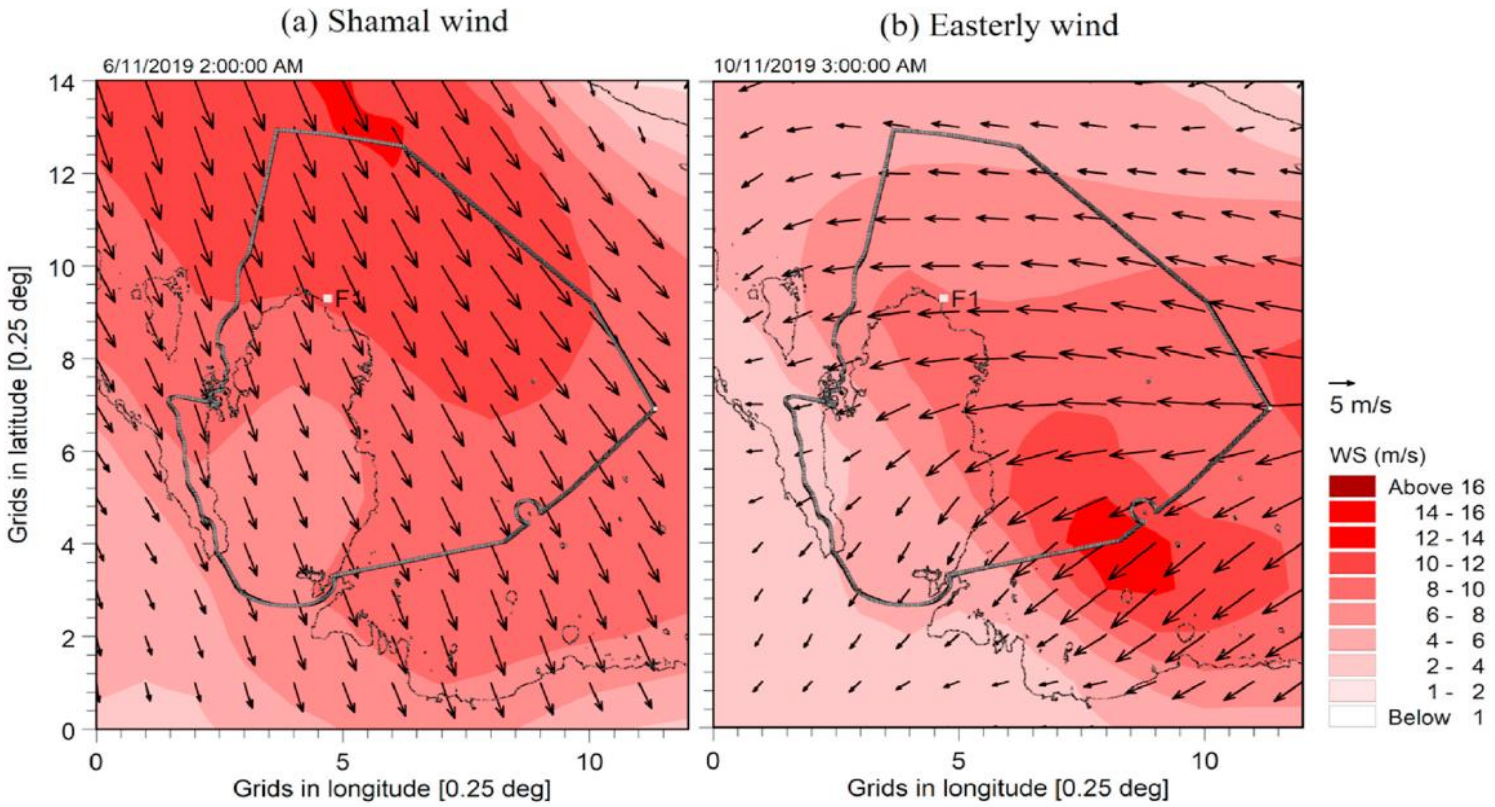
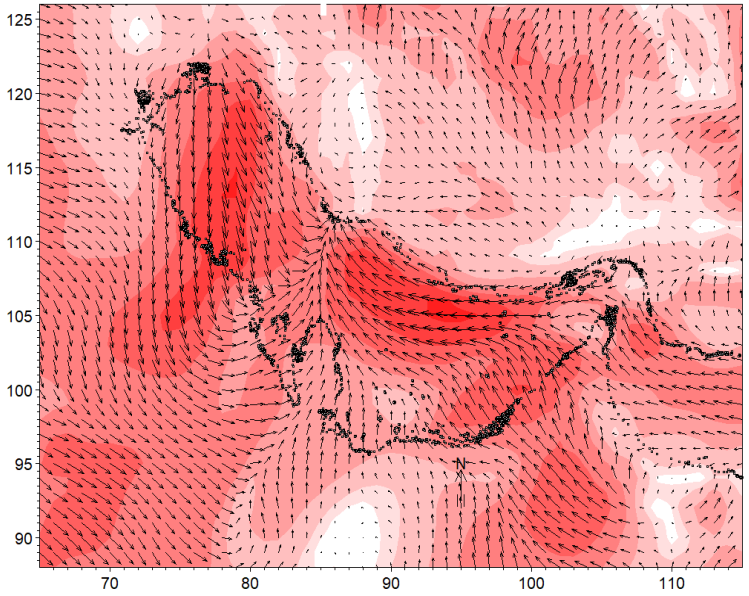
Shamal and Nashi winds



Convergence of Shamal and Nashi winds
(during winter)



Data source: ERA5

F1: Wave measurement location (off Fuwairit)

(Aboobacker et al., 2021)

- **Shamal winds: NW direction; more frequent**
- **Nashi winds: E/NE direction; stronger, but less frequent**

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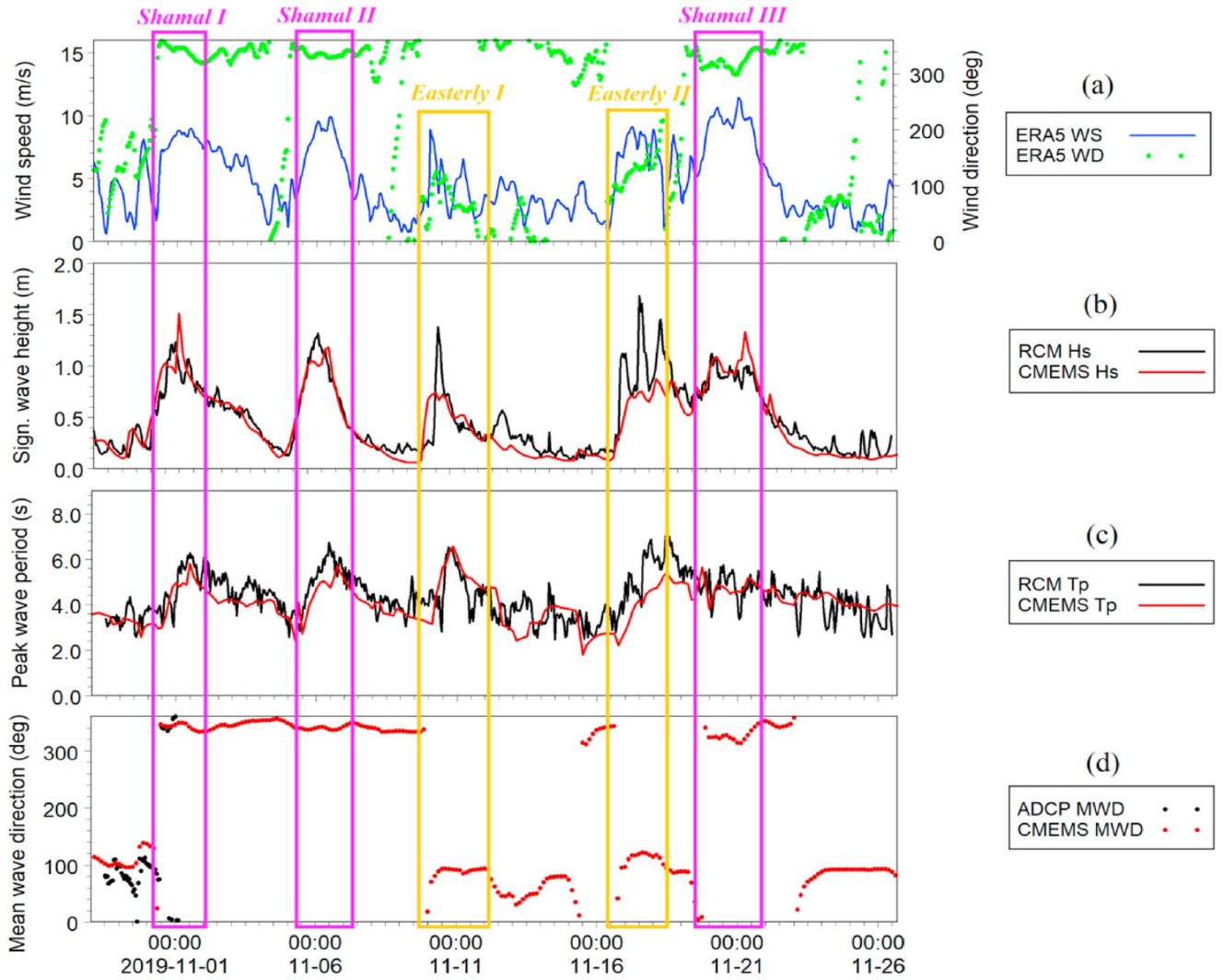
(a) ERA5 wind speed and direction,

(b) Hs from RCM and Copernicus Marine,

(c) Tp from RCM and Copernicus Marine and

(d) MWD from ADCP and Copernicus Marine.



The wave measurement location (off Fuwairit) falls in a dry grid in 9 km resolution model, while it falls in a wet grid in 22 km resolution model. Thus, the validation of the Copernicus Marine waves has been carried out using the latter.

	C.C.	Bias	RMSE	SI
Hs (m)	0.88	-0.05	0.17	0.35
Tp (s)	0.68	-0.29	0.77	0.18

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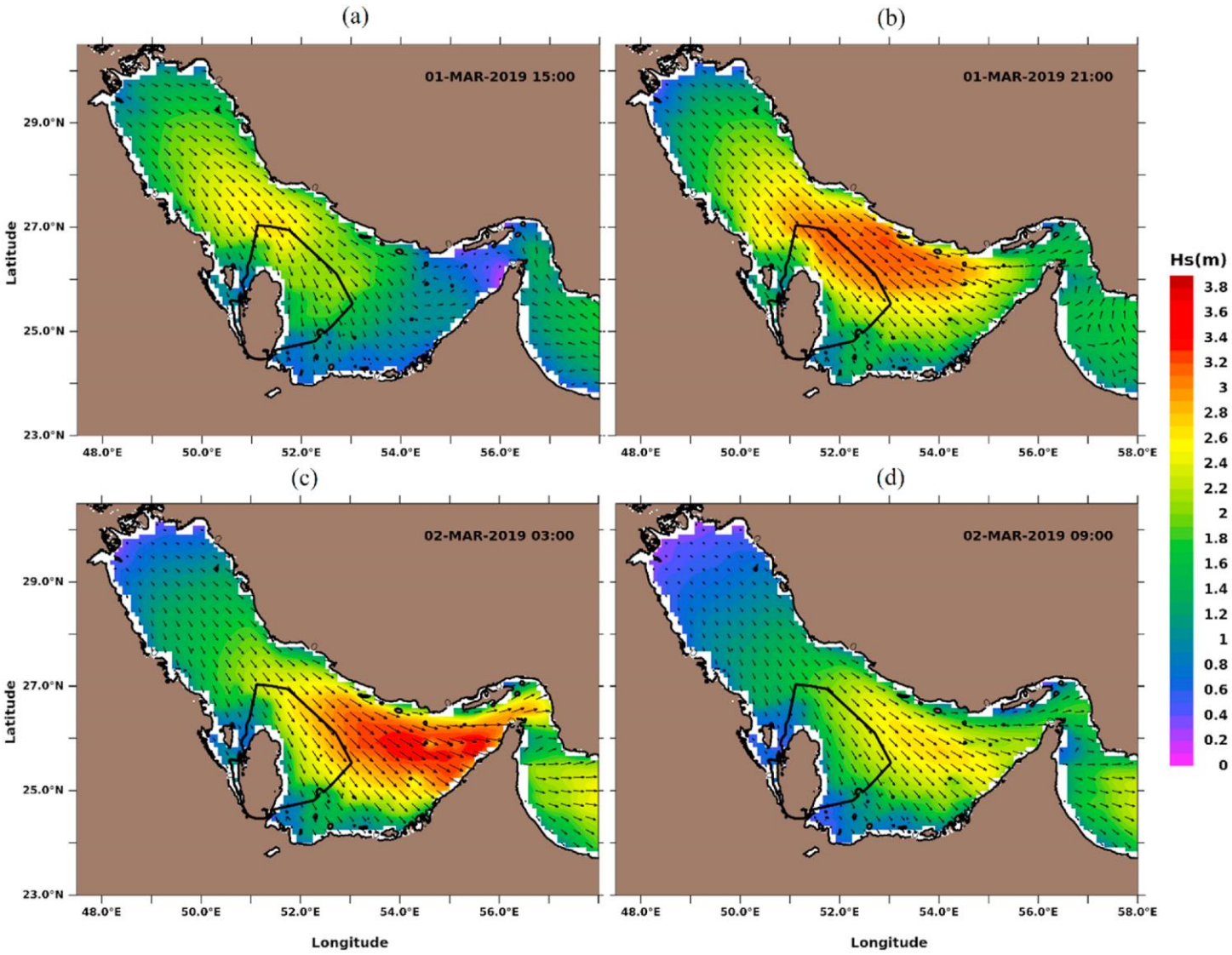

Spatial distribution of **shamal wind induced waves** in the Gulf during 01–02 Mar 2019:
(a) 15 h, (b) 21 h, (c) 03 h and (d) 09 h.

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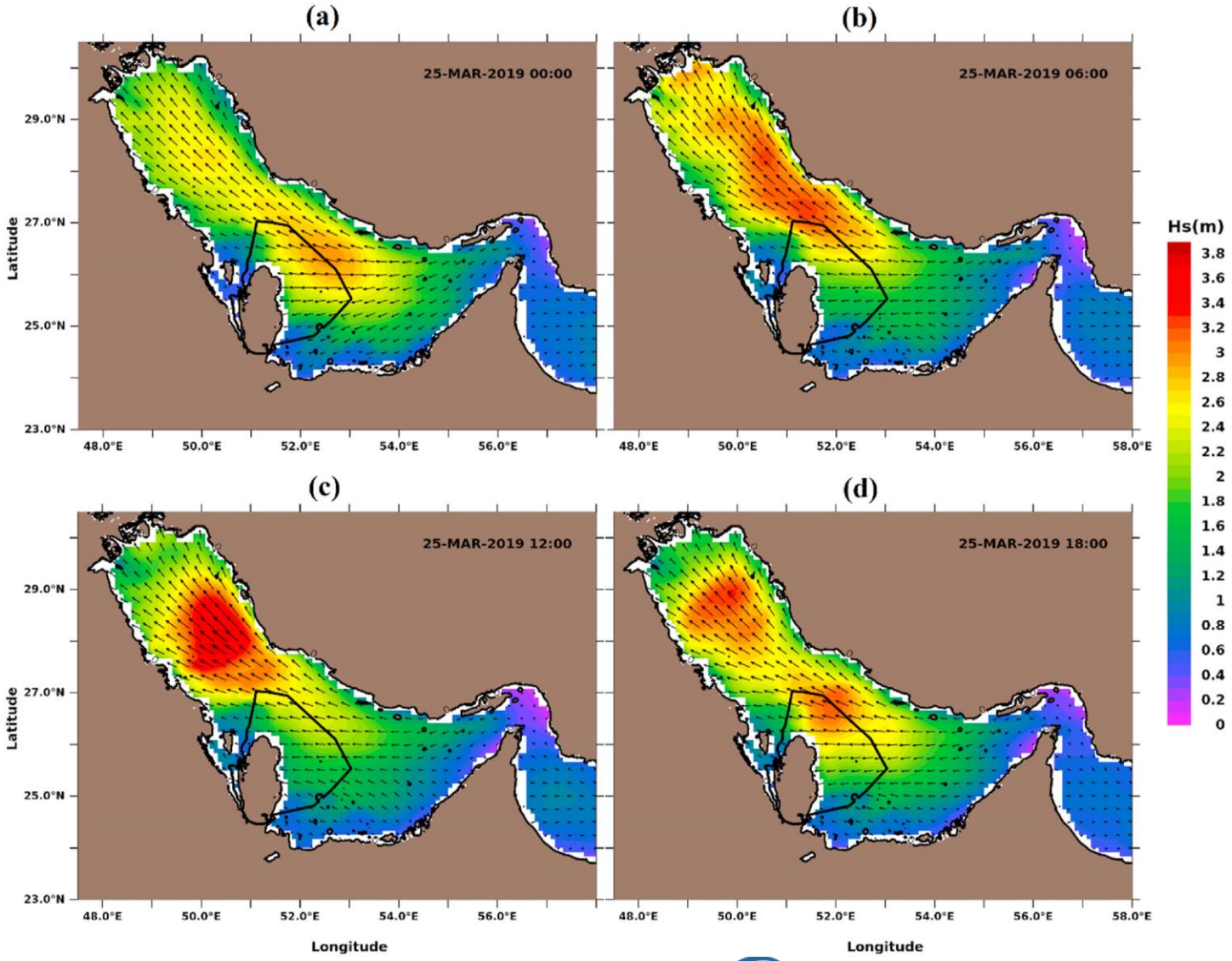

Spatial distribution of **Nashi wind induced waves** in the Gulf on Mar 25, 2019:
(a) 00 h, (b) 06 h, (c) 12 h and (d) 18 h

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Case 2:

Marine Pollution Bulletin 159 (2020) 111478

Contents lists available at ScienceDirect

Marine Pollution Bulletin

journal homepage: www.elsevier.com/locate/marpolbul

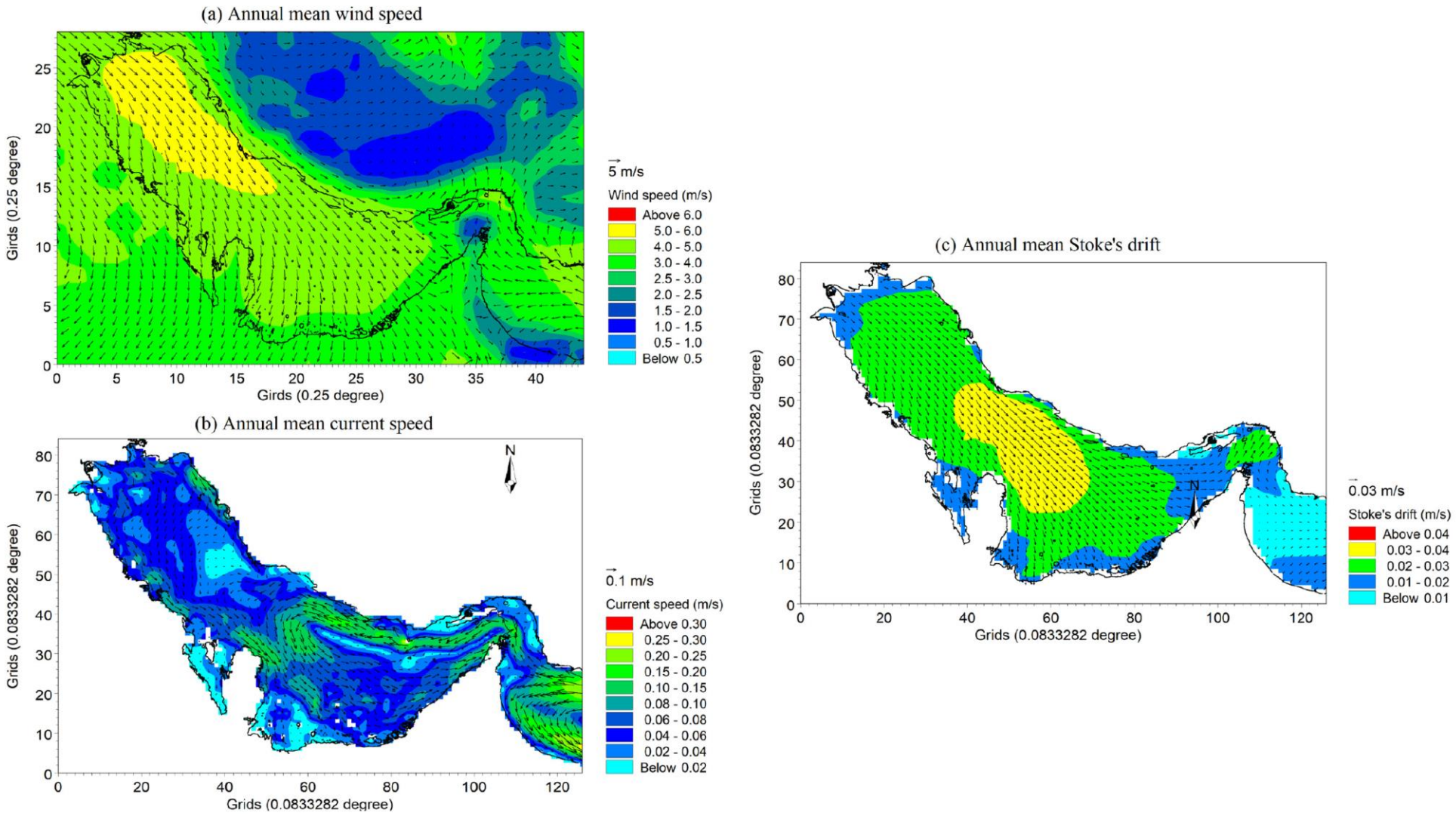
Sources, spatial distribution and characteristics of marine litter along the west coast of Qatar

S. Veerasingam, Jassim A. Al-Khayat, V.M. Aboobacker, Shafeeq Hamza, P. Vethamony*

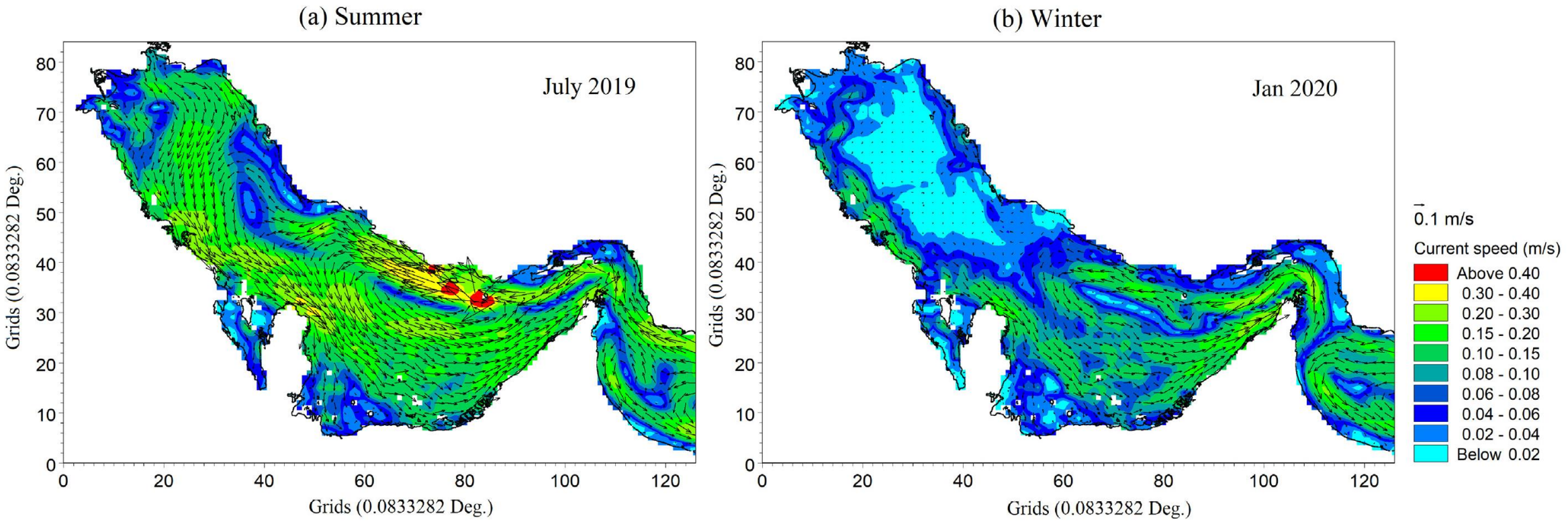
Environmental Science Center, Qatar University, P.O. Box: 2713, Doha, Qatar

Copernicus Marine use cases

Annual mean pattern of
(a) wind speed
(b) current speed and
(c) Stokes drift



Copernicus Marine use cases



Monthly mean current speeds during (a) July 2019 and (b) Jan 2020

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Copernicus Marine use cases

Few other cases

Marine Pollution Bulletin 159 (2020) 111486

Contents lists available at ScienceDirect

Marine Pollution Bulletin

journal homepage: www.elsevier.com/locate/marpolbul

Spatial distribution, structural characterization and weathering of tarmats along the west coast of Qatar

S. Veerasingam, Jassim A. Al-Khayat, K.P. Haseeba, V.M. Aboobacker, Shafeeq Hamza, P. Vethamony*

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Science of the Total Environment 776 (2021) 145985

Contents lists available at ScienceDirect

Science of the Total Environment

journal homepage: www.elsevier.com/locate/scitotenv

Hitchhiking of encrusting organisms on floating marine debris along the west coast of Qatar, Arabian/Persian Gulf

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Environmental Science and Pollution Research (2021) 28:34259–34268
https://doi.org/10.1007/s11356-020-12100-4

RESEARCH ARTICLE

Factors influencing the vertical distribution of microplastics in the beach sediments around the Ras Rakan Island, Qatar

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Marine Pollution Bulletin 175 (2022) 113330

Contents lists available at ScienceDirect

Marine Pollution Bulletin

journal homepage: www.elsevier.com/locate/marpolbul

Baseline

History of a disaster: A baseline assessment of the Wakashio oil spill on the coast of Mauritius, Indian Ocean

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Conclusions

- We typically used the Copernicus Marine data in studies on:
  - Characterization of surface waves
  - Transport of marine debris, microplastics and spilled crude oil
- Using Copernicus Marine data, we derived:
  - Typical wave patterns in response to various wind events (shamal, nashi, etc.)
  - Monthly, seasonal and annual climatology of surface waves and stokes drift
  - Monthly, seasonal and annual climatology of surface currents
- Reasonable accuracy in Copernicus Marine wave parameters were obtained when compared with measured waves
- We relied on the global accuracy of Copernicus Marine when dealt with surface currents