航运数据分析

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Vessel information

Pacific Vision 398,411 DWT Ore Carrier Built 2018 (In Service)

Standard Details

IMO Number 9806990, Owners are China Merchants Shpg, Built at Shanghai Waigaoqiao delivered in Nov 2018, Hong Kong Flagged, China, DNV GL Classed, P&I insurance with Skuld, Length Overall of 362.00 m., Length Between Perpendiculars of 355.00 m., Draught of 23.00 m., Beam of 65.00 m., Gross Tonnage of 203,396, Design SDARI Valemax by SDARI, MAN B. & W. Engine, Horsepower of 44,826, Power Type: Diesel 2-Stroke, BWTS (Fitted), Scrubber (Installed), LNG Ready, Eco – Electronic Engine Modern.

Company Details

Owner: China Merchants Energy Shipping Co Ltd, 32/F, China Merchants Tower, Shun Tak Centre, Hong Kong, Hong Kong, Telephone Number: +852 (0) 251 721 28, Fax Number: +852 (0) 254 734 82, E-mail Address: cmhk@cmhk.com, URL: http://www.cmenergyshipping.com. China Merchants Energy Shipping Co Ltd is a group company of China Merchants Group.
Group Company: China Merchants Group, 168-200 # 39-40 China Merchants Tower, Central Shun Tak centre, Hong Kong, Hong Kong, E-mail Address: cmhk@cmhk.com, URL: http://www.cmhk.com.
Technical Manager: Hong Kong Ming Wah Shipping Co Ltd, 31/F, China Merchants Tower, Shun Tak Centre, Hong Kong, Hong Kong, Telephone Number: +(852) 2517 2128, Fax Number: +(852) 2547 3482, URL: http://www.cmenergyshipping.com.
Operator: Vale SA, Av. das Americas, 700, 2nd floor, Barra da Tijuca, Rio de Janeiro, Brazil, RJ 22640-100, Telephone Number: +55 (0) 213 814 4477, Fax Number: +55 21 3814 4040, E-mail Address: rio@vale.com, URL: http://www.vale.com.
P&I insurance with: Assuranceforeningen Skuld, Radhusgaten 27, Oslo, Norway, 0158, Telephone Number: +47 (0) 22 00 2200, Fax Number: +47 22 42 42 22, E-mail Address: osl@skuld.com, URL: http://www.skuld.com.
Registered Owner: Pacific Vision Shipping Co Ltd, Hong Kong.

Eco Details

Power Type: Diesel 2-Stroke. BWTS (Fitted). Scrubber (Installed). LNG Ready. Eco – Electronic Engine Modern.
ENVIRONMENTAL EQUIPMENT 1 x Exhaust Scrubber - SOx - Alfa Laval PureSOx - 2019 installation year. 1 x HVSC -High Voltage Shore Connection. 2 x BWTS - Ballast Water Treatment System - Sunrui BC-3000 at 3000cu.m/hr.

Specialist Details

7 Holds, 7 Hatches, Strengthened for Ore, Strengthened for Heavy Cargo, Ship is too large to transit the neo-Panamax locks of the Panama Canal based on current official dimension restrictions.

Additional Information

IDENTIFICATION: Launch Name was Pacific Vision. Capesize Bulker, Call Sign VRRJ5, IMO Number 9806990, Hull Number H1447. DIMENSIONS/TONNAGES: Moulded Depth of 30.40 m., Tonnage of 66,606 International Net and 392,118 Dwt (long). ENGINE DETAILS: Engine Description 2 S.A. 7-cyl., Engine Model 7G80ME-C9.5, 1 FP Propellor. SAFETY AND OTHER DETAILS: Last known special survey in November 2018, Ballast Capacity of 267,812 tonnes.

Data description

NAME	NOTES
SOG (kn)	Speed over ground，对地速度
DRAUGHT (m)	吃水
COG (°)	Course over ground，对地航向
HDG (°)	Heading，船艏向
CURRENT (°)	流向
TRUE WIND (°)	风向
WAVE (°)	风浪方向
SWELL (°)	涌浪方向
CURRENT (kn)	流速
TRUE WIND (m/s)	风速
WAVE (m)	浪高
SWELL (m)	涌浪高度
GUST (m/s)	阵风风速
SEAS (m)	耦合浪高

- 1kn = 1海里/时 (nmile/h)
- 1海里 = 1852米
- 1kn = (1852/3600) m/s

- **对地速度**
- **服务航速 (service speed)**
  12 kn！

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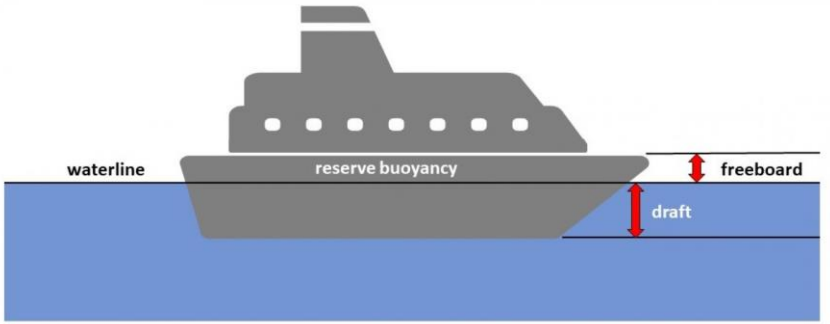
- 吃水



空载、负载

载重量

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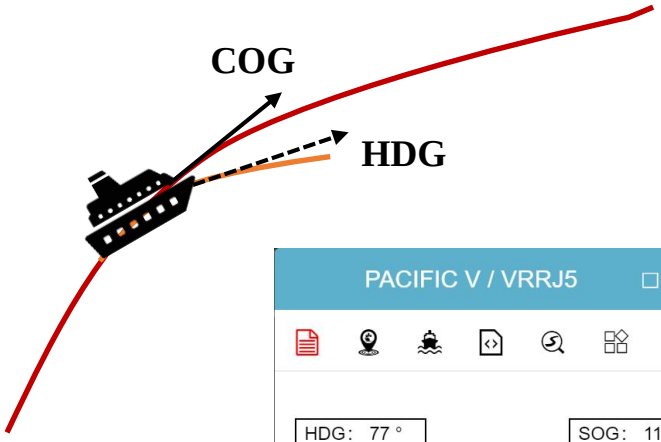
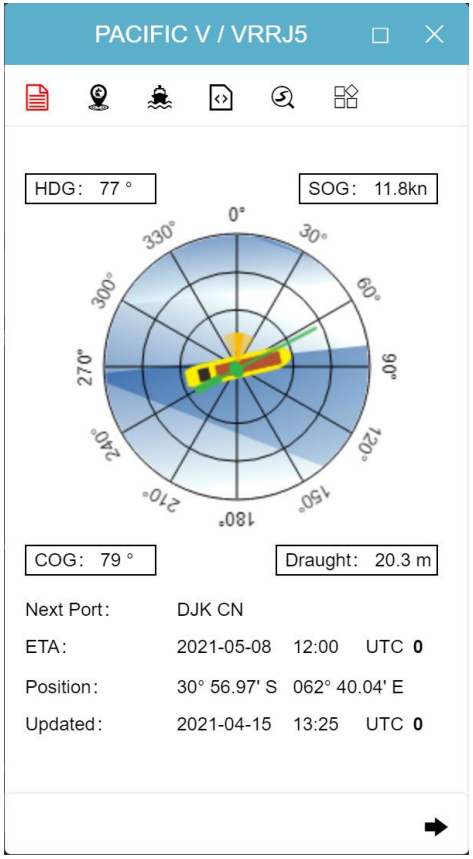
SEAS (m)	耦合浪高

- 对地航向vs船艏向





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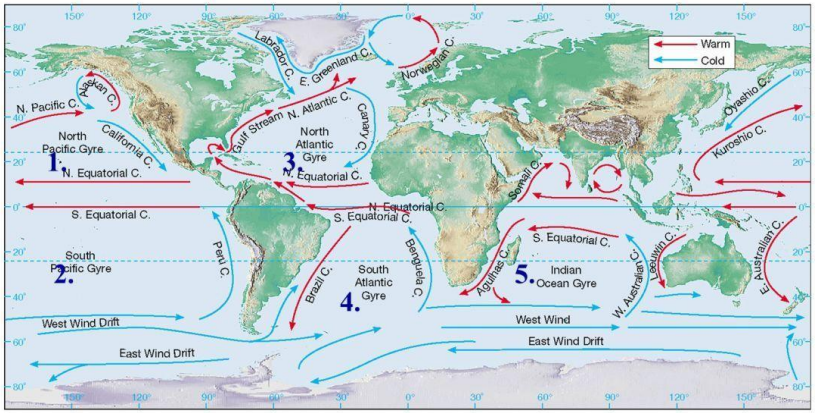
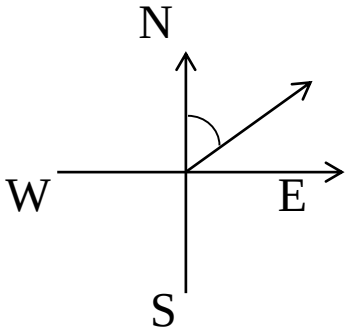
SEAS (m)	耦合浪高

- 流向



其中，COG, HDG, 流向角度是去向与正北方向夹角：



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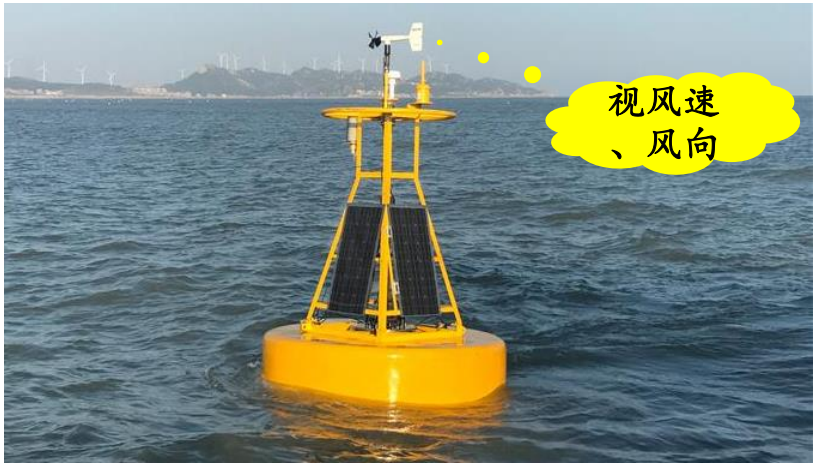
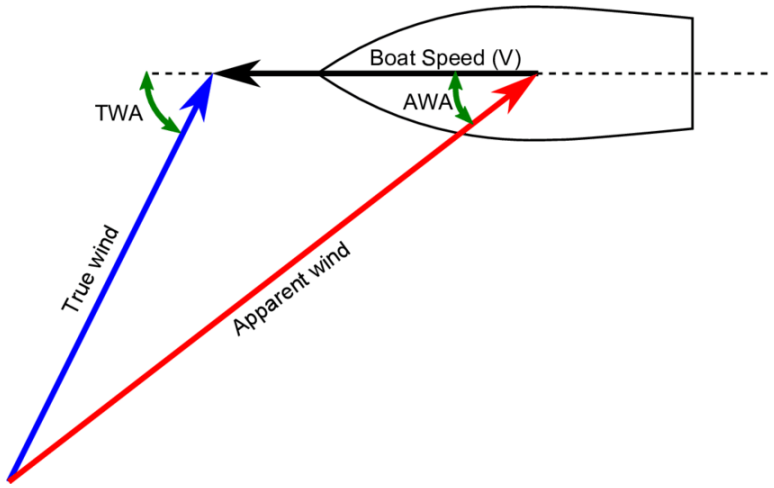
- 真风速、风向





Data description

名称	解释
SOG (kn)	Speed over ground，对地速度
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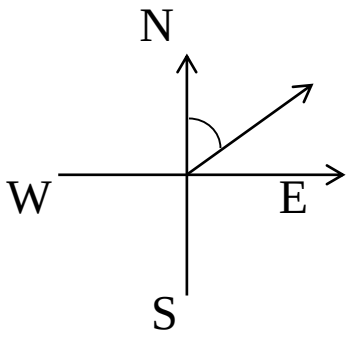
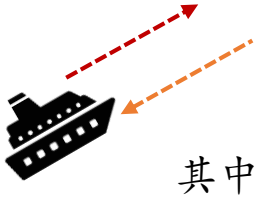
SEAS (m)	耦合浪高

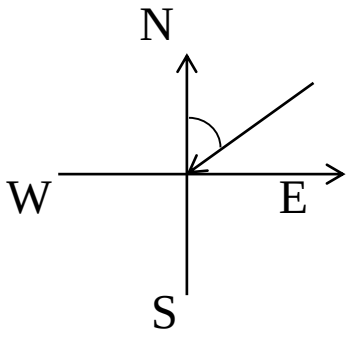
- 风浪、涌浪及方向

其中，COG, HDG, 流向角度是去向与正北方向夹角：





其中，风向, 风浪、涌浪方向角度是来向与正北方向夹角：



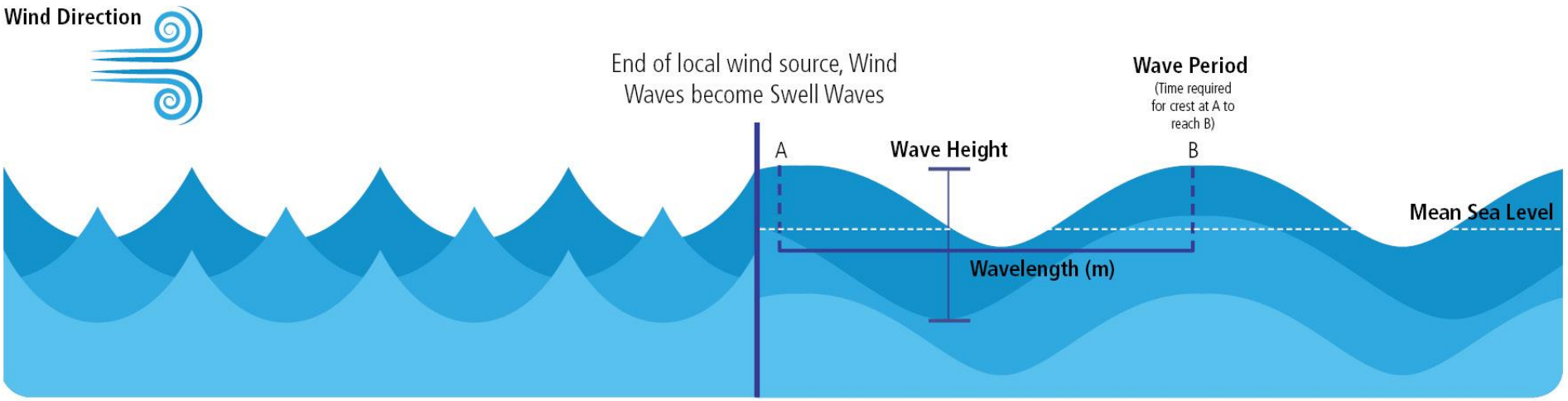
Data description

WIND WAVES

Wind Waves are generated by immediate local wind. They are not self-sustaining and will die out when the wind stops.

SWELL WAVES

Swell Waves are self-sustaining and generated by energy beneath the ocean's surface, no longer needing local wind.



Waves with long wavelengths and periods arriving from a distant source are considered Swell.

Data abnormal

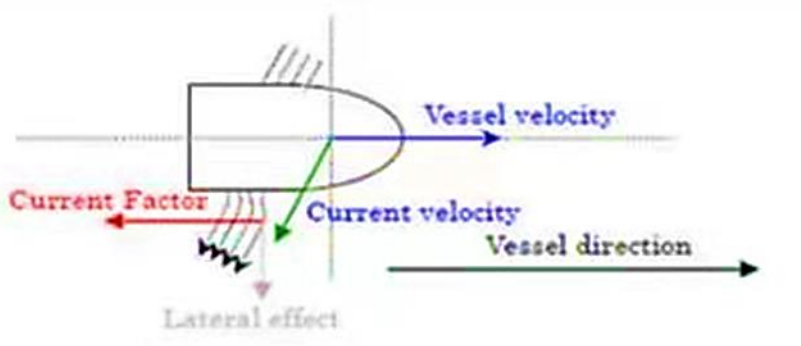
1. the ones that are lack of any environment feature
   (e.g. no current data, *2019-03-line16*)

2. abnormal data whose wave height and direction are always kept in pairs, as 0m and 180°
   (e.g. *2019-03-line86*)

3. whose current speed is 0
   (e.g. *2019-06-line2305*)

Speed through water

- 对水速度（speed through water）计算公式：



$$CF = SOG \cdot \cos(\phi)$$

where ϕ is the angle between the vessel and the current

$$STW = SOG - CF$$

Voyage information

- 19/03/02 - 19/04/19 DALIAN - ITAQUI
- 19/04/26 - 19/06/03 ITAQUI - SINGAPORE
- 19/06/11 - 19/07/14 SINGAPORE - ITAQUI
- 19/07/20 - 19/09/10 ITAQUI - DALIAN
- 19/09/13 - 19.09.18 DALIAN - HONGKONG
- 19/11/02 - 19/11/07 HONGKONG - SINGAPORE
- 19/11/09 - 19/12/11 SINGAPORE - ITAQUI
- 19/12/21 - 20/02/13 ITAQUI - CAOFEIDIAN
- 20/02/20 - 20/04/09 CAOFEIDIAN - ITAQUI
- 20/05/27 - 20/07/21 ITAQUI - DALIAN
- 20/08/03 - 20/08/12 DALIAN - SINGAPORE
- 20/08/13 - 20/09/13 SINGAPORE - ITAQUI
- 20/09/16 - 20/11/06 ITAQUI - DALIAN
- 20/11/11 - 20/11/20 DALIAN - SINGAPORE
- 20/11/21 - 20/12/20 SINGAPORE - ITAQUI
- 20/12/26 - 21/02/01 ITAQUI - TELUK RUBIAH
- 21/02/08 - 21/02/09 TELUK RUBIAH - SINGAPORE
- 21/02/11 - 21/03/12 SINGAPORE - ITAQUI

Voyage information

资料来源：中气导 http://www.meteochina.com/

TASK

Speed prediction:

1. **Data analysis/pre-processing/…:**

① Statistical evaluation, correlation analysis, …
② Data complement (or not ?)
③ Anomaly detection (or not ?)

2. **Model evaluation/comparison/analysis/improvement/…:**

① multi-linear regression
② Convolutional neural network
③ Support vector machine
④ K-nearest neighbor
⑤ Decision tree
⑥ Random forest
⑦ …