一般研究

マイクロ波放射計及びメソ気象モデルを用いた洋上風力資源評価方法の開発
- 大気安定度の風力資源に及ぼす影響 -

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内容

1. はじめに
2. AMSR-E海面水温と風速の検証
3. 洋上風力資源に及ぼす大気安定度の影響
4. まとめ

Wind speed distribution derived from AMSR-E

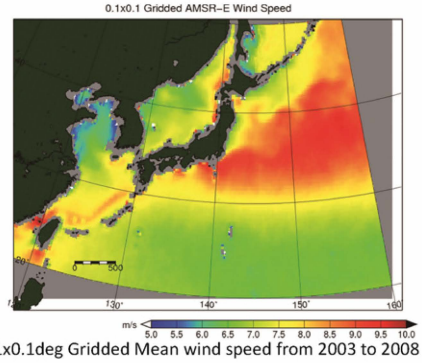
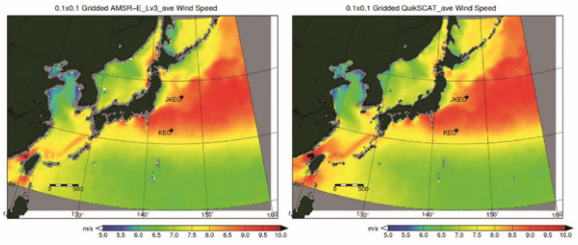


Fig.1 0.1x0.1deg Gridded Mean wind speed from 2003 to 2008 (Suga, 2011)



AMSR-E(2003-2008mean) **SeaWinds(2003-2008mean)**

Fig.2 Comparison between AMSR-E and SeaWinds(Suga, 2011)

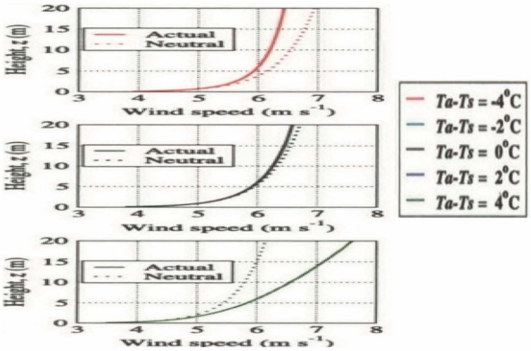


Fig.3 Comparison of stability-dependent and neutral wind speeds for (top) unstable, (middle) neutral and (bottom) stable conditions. (from Kara et al. (2008))

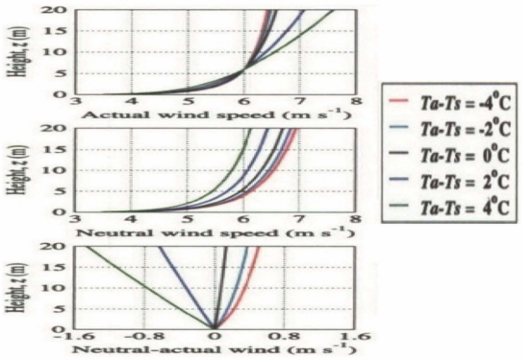


Fig.4 Typical variations of (top) stability-dependent and (middle) equivalent neutral winds with height along with (bottom) the differences between the two.(from Kara et al. (2008))

Purpose

1. 異なる海面水温プロダクトを用いることにより大気安定度の洋上風力資源に及ぼす影響を調べる。

2. AMSR-E風速を用いた洋上風力資源評価方法の開発

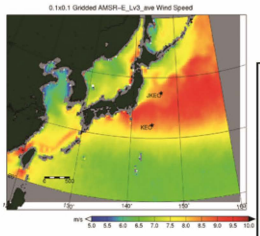


Fig.1 Study area covered by AMSR-E onboard Aqua during the period from 2003 to 2008. (Stars indicate the location of the JKEO & KEO buoys.)

Table 1 Specifications of AMSR-E on board Aqua

Orbit	Sun-synchronous
Altitude	705km
Inclination	98 deg
Local time	04:30, 16:30(UT)
Frequency	6.925, 10.65, 18.7, 23.8, 36.5, 89.0 (GHz)
Spatial res.	5~50km
Polarization	HH and VV
Incidence angel	55 degrees
Swath	1450km
Period	2003-2008

Fig.2 JKEO buoy (Measurement height 4m)

Wind speed at JKEO buoys at 4m → Equivalent Neutral Wind speed at 10m → Stability dependent Wind speed at 10m

LKB code (Tang and Liu, 1996)

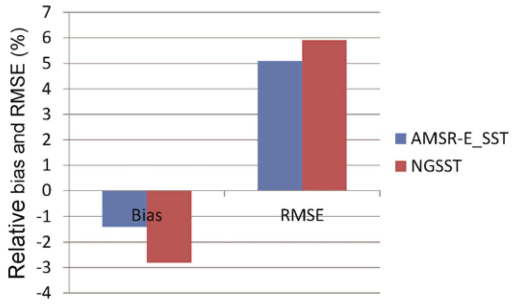


Fig.3 Results of relative bias and RMSE for JKEO buoy SST

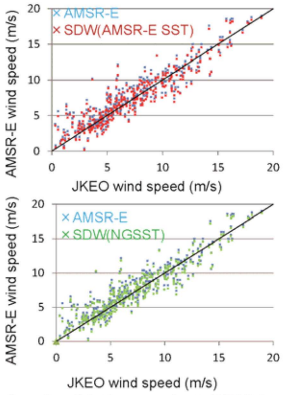


Fig.4 Results of validation against JKEO buoy (2007-2008)

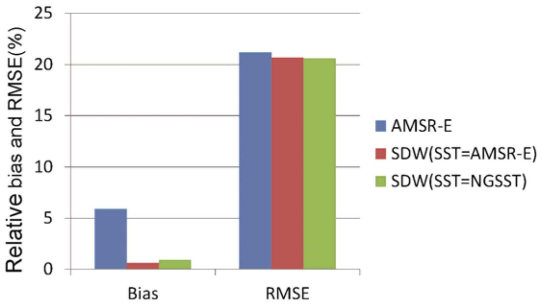


Fig.5 Results of relative bias and RMSE for JKEO buoy wind speed

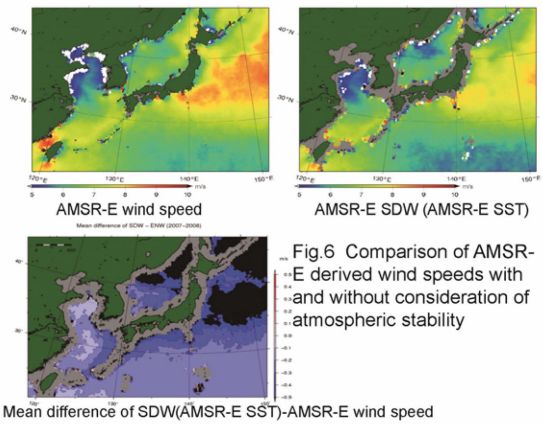


Fig.6 Comparison of AMSR-E derived wind speeds with and without consideration of atmospheric stability

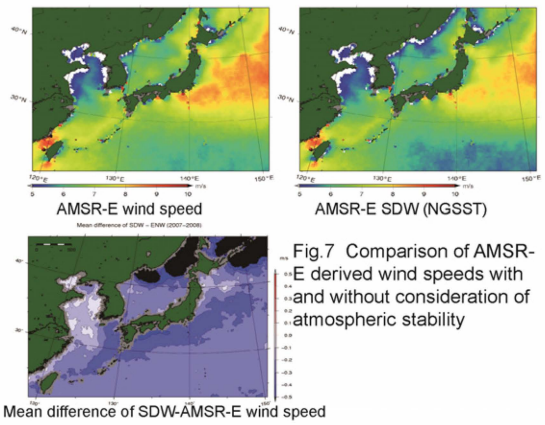
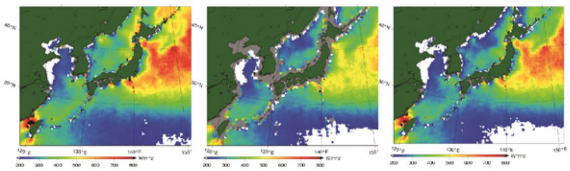


Fig.7 Comparison of AMSR-E derived wind speeds with and without consideration of atmospheric stability



(a) AMSR-E derived Weibull energy density

(b) AMSR-E SDW (AMSR-E SST) derived Weibull energy density

(c) AMSR-E SDW (NGSST) derived Weibull energy density

Fig.8 Comparison of AMSR-E derived Weibull energy density with and without consideration of atmospheric stability (different SST sources)

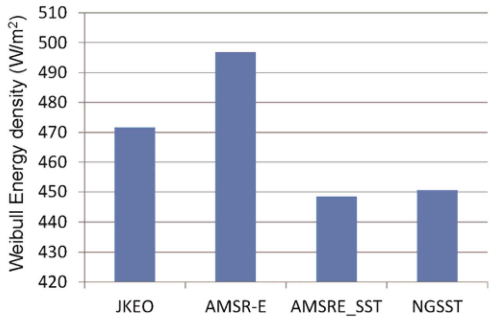


Fig.9 Comparison of energy densities derived from JKEO buoy, AMSR-E with and without consideration of atmospheric stability.

まとめ

(1) JKEOブイ海面水温 に対するAMSR-E海面水温とNGSST の検証結果はAMSR-E海面水温がNGSSTに比較して低いバイアスとRMSEを示した。

(2) 大気安定度を考慮した場合と考慮しない場合のAMSR-E風速の検証結果は考慮した場合が考慮しない場合に比較して低いバイアスとRMSEを示した。

(3) AMSR-E海面水温とNGSSTを用いて大気安定度を考慮したWeibull エネルギー密度はJKEOブイから求められたWeibull エネルギー密度に近い

Acknowledgements

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