

Meteorological impact of regional ocean data assimilation – benefit of eddy-resolving SST estimates –

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Introduction

Surface temperature of the wintertime Japan Sea

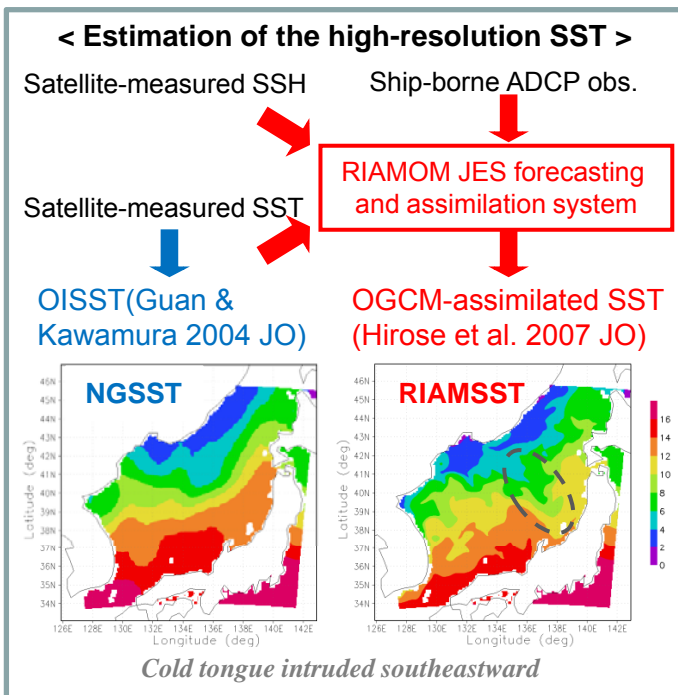
Cloud cover

Coastal areas
Precipitation

Data missing in infrared
detection (1-5 km res.)

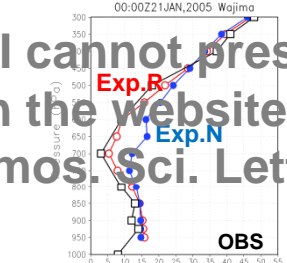
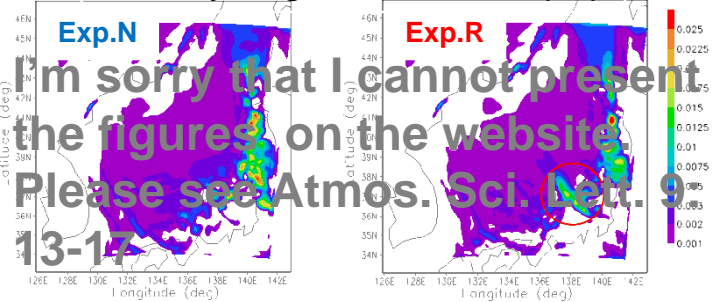
Data missing in microwave
detection (25-50 km res.)

It is difficult to detect mesoscale eddies by satellite SST observation.



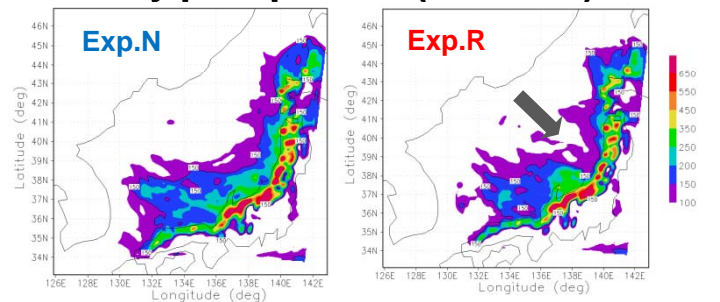
Cold-air outbreak (Jan21, 2005)

Vertically-Integrated cloud water (cm)



The results in Exp. R agree well with observation, compared to Exp. N.

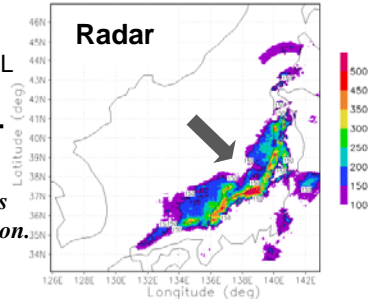
Monthly precipitation (Jan 2005)



RMS difference between
hyetometer OBS and MODEL

Exp.N	Exp.R
151.6	119.6 mm

OGCM-assimilated SST improves simulation of monthly precipitation.



Objective

Eddy-resolving OGCM-assimilated SST

Impact of regional ocean data assimilation on weather simulation in cloud-covered marginal sea areas

The assimilated SST is expected to improve weather simulation and elucidate the mesoscale air-sea interaction process.

Atmospheric model

PSU/NCAR MM5V3 (Grell et al. 1993)
Outer mother domain (around Japan): 30 km res.
2way-nested domain (Japan Sea area):10km res.
(Yamamoto & Hirose 2007GRL, 2008ASL, ...)

Exp. N: NGSST(Optimum-Interpolated SST)

Exp. R: RIAMSST(OGCM-assimilated SST)

Conclusions

1. Mesoscale oceanic eddies significantly influence coastal weather system.
2. Regional ocean data assimilation improves mesoscale atmospheric simulations.

The assimilated SST is useful for regional weather forecasting in the marginal sea area.