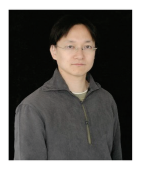
ATMOSPHERIC RESPONSE TO THE JAPAN SEA AND THE EAST CHINA SEA IN AN AGCM



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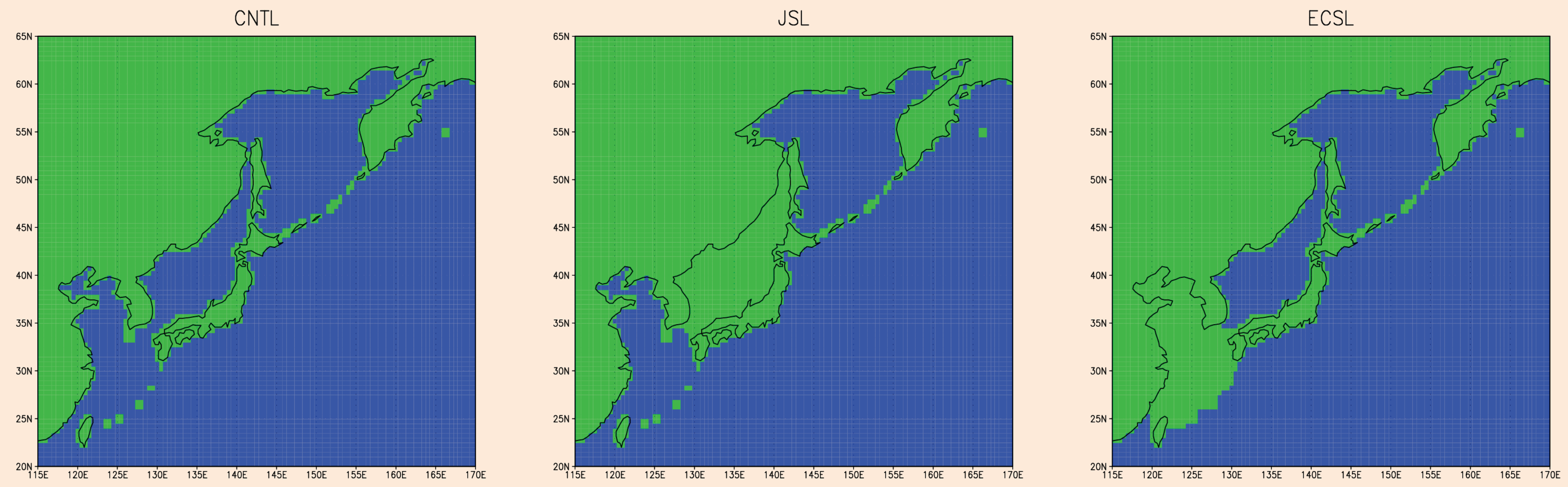
Experiment Setting

Model: T239（50km）L48 AFES ver. 3

SST: 0.25 degree Daily AVHRR only OISST

Periods: 10 years（1981. 9〜1991. 8）



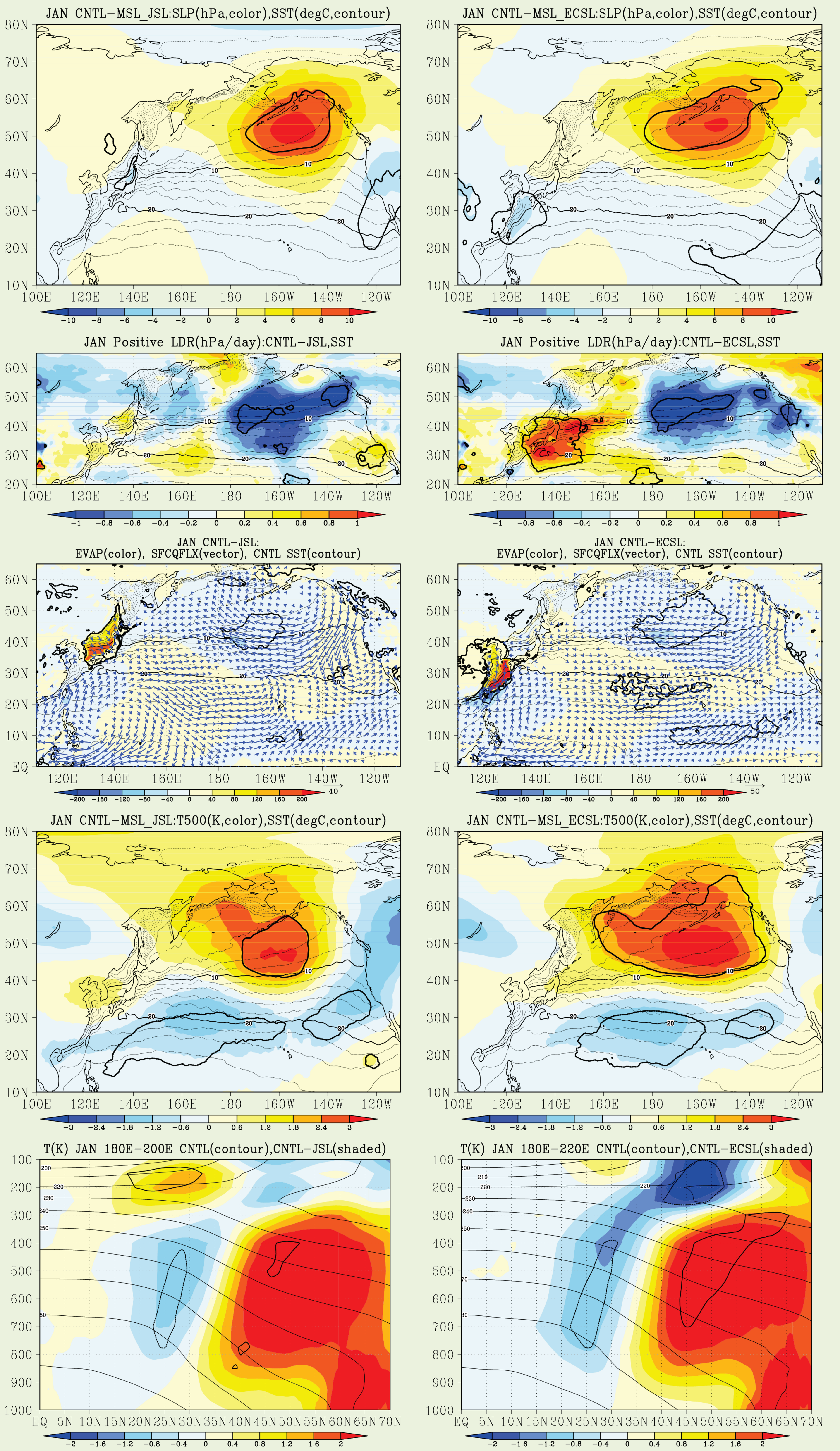
Summary

1. The marginal seas provide large moisture to atmosphere and enhance cyclone activity through latent heat release.
2. Large-scale responses appear over the Gulf of Alaska only in January in both experiments.
3. Cloud activity in subtropics associated with moisture circulation change may cause the large-scale response.

Acknowledgements

AFES integrations were performed on the Earth Simulator with support of JAMSTEC. The work is supported by MEXT KAKENHI 22244057 and 22106008.

Large-scale Response



Cyclone Activity

Lagrangian cyclone tracking depends on data resolution and its methods for detection and connection.

Local Deepening Rate (LDR) is defined as

$$LDR = -\frac{\partial p_{sfc}}{\partial t}\frac{\sin 60^\circ}{\sin\theta} = -\frac{SLP(t+6h)-SLP(t-6h)}{12h}\frac{\sin 60^\circ}{\sin\theta}$$

- Pressure tendency equation (Fink et al. 2012)

$$\frac{\partial p_{sfc}}{\partial t} = \underbrace{\rho_{sfc}\frac{\partial \phi_{100hPa}}{\partial t}}_{D\phi} + \underbrace{\rho_{sfc}R_d\int_{sfc}^{100hPa}\frac{\partial T_v}{\partial t}\,d\ln p}_{ITT} + \underbrace{g(E-P)}_{EP}$$

$$ITT = \underbrace{\int_{sfc}^{100hPa} DT_vDYN\,d\ln p}_{DYN} + \underbrace{\int_{sfc}^{100hPa} DT_vCUM\,d\ln p}_{CUM} + \underbrace{\int_{sfc}^{100hPa} DT_vLSC\,d\ln p}_{LSC} + \underbrace{\int_{sfc}^{100hPa} DT_vRADL\,d\ln p}_{RADL} + \underbrace{\int_{sfc}^{100hPa} DT_vRADS\,d\ln p}_{RADS} + \underbrace{\int_{sfc}^{100hPa} DT_vVDF\,d\ln p}_{VDF}$$