

대기 강제력에 대한 해빙모형에서의 북극 해빙 반응 특성 분석

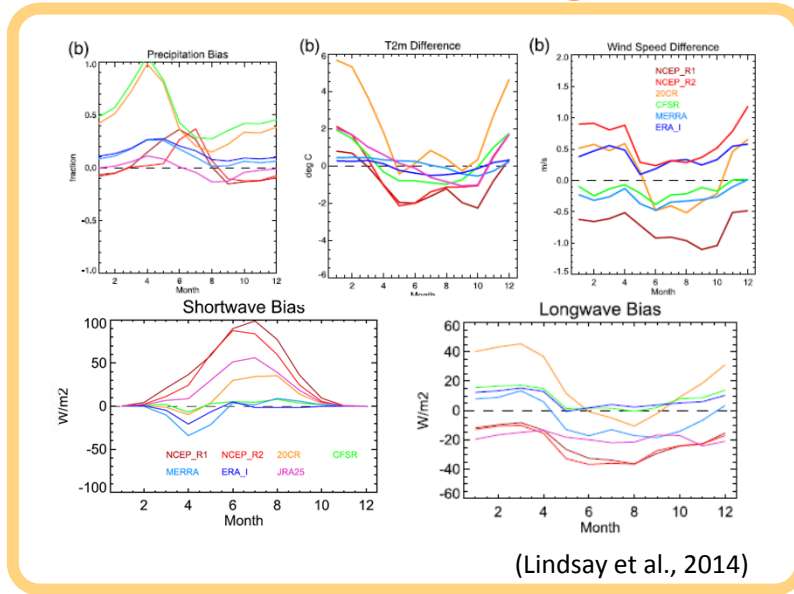
극지연구소

이수봉 김백민 김주홍 강성호

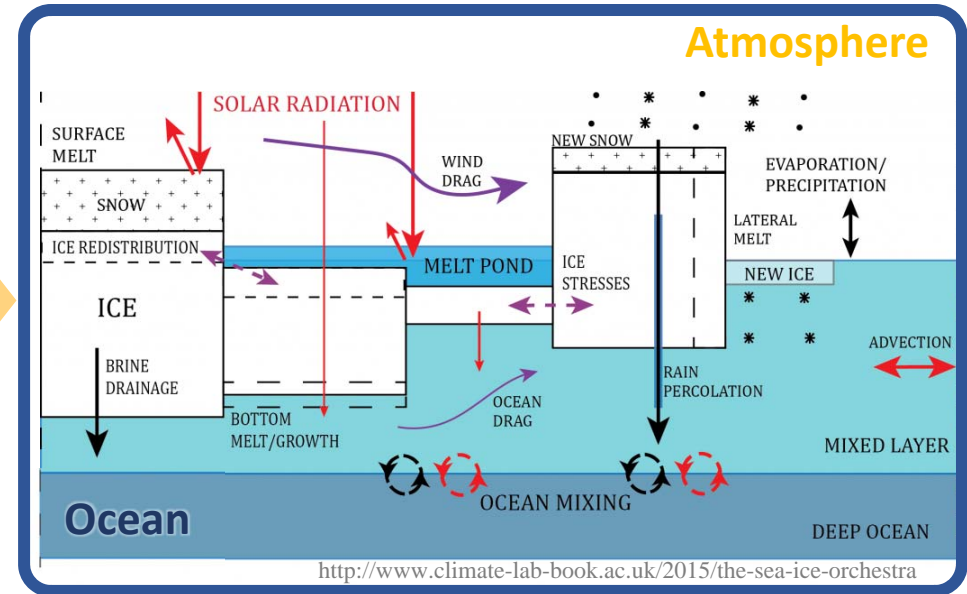


Introduction

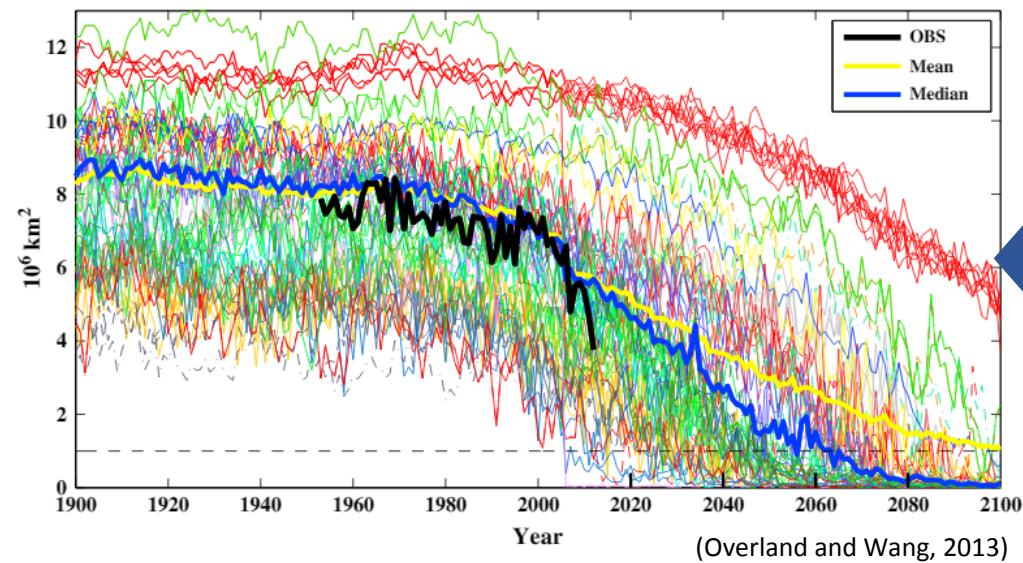
External Forcing



Model

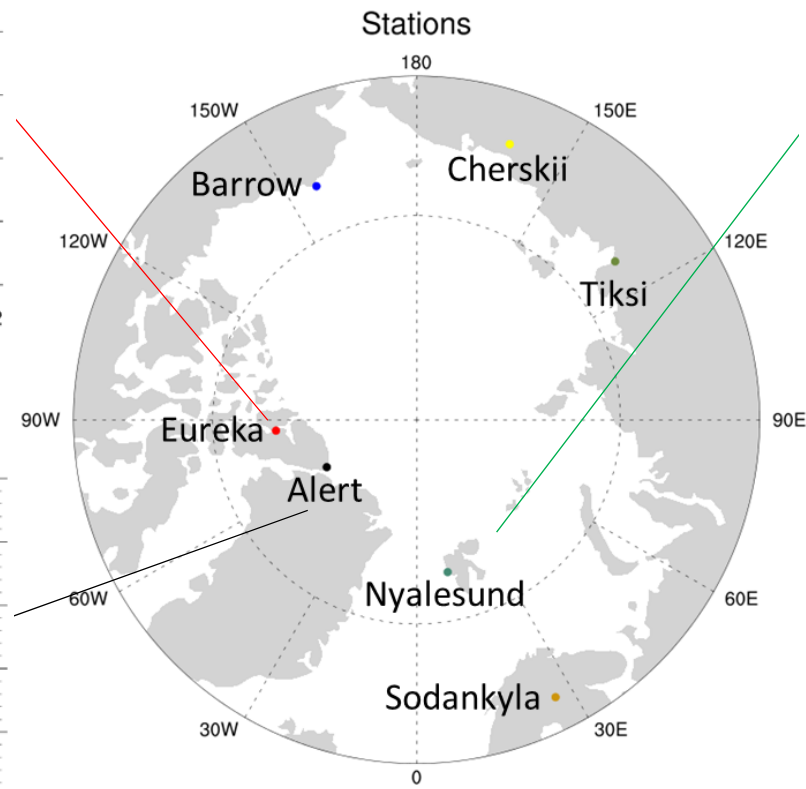
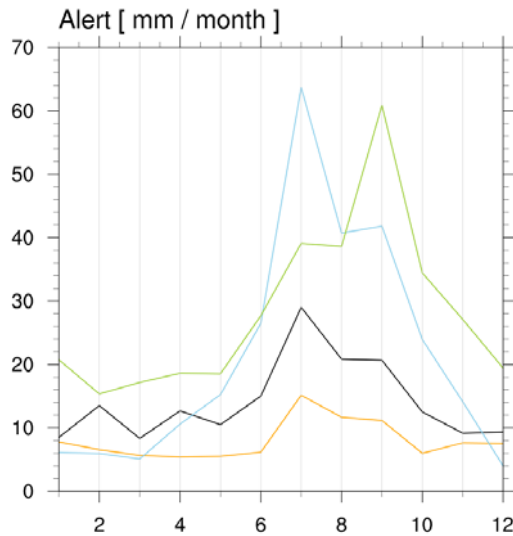
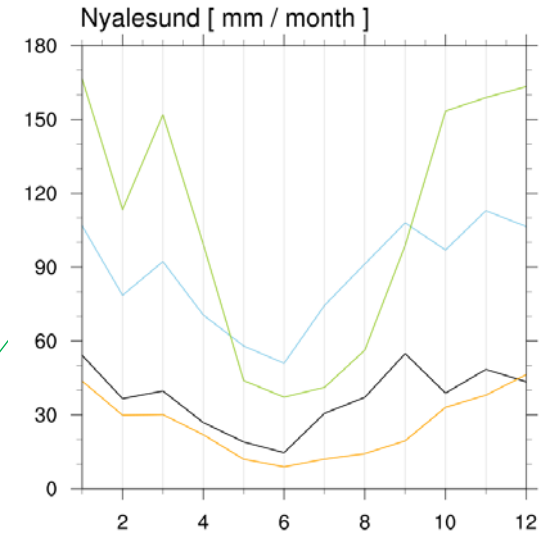
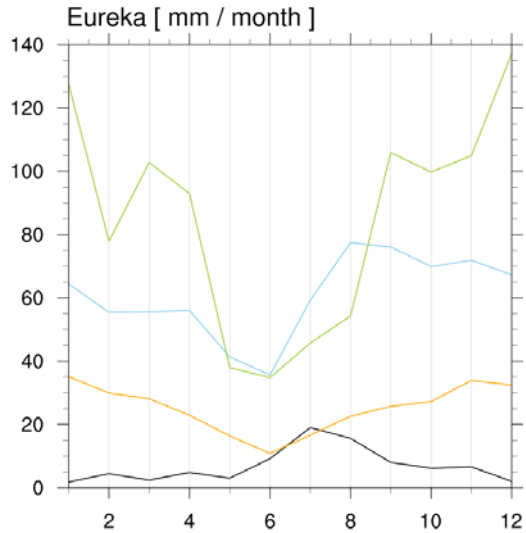


Model Results September Sea Ice Extent



Motive

강수 재분석 자료의 불확실성

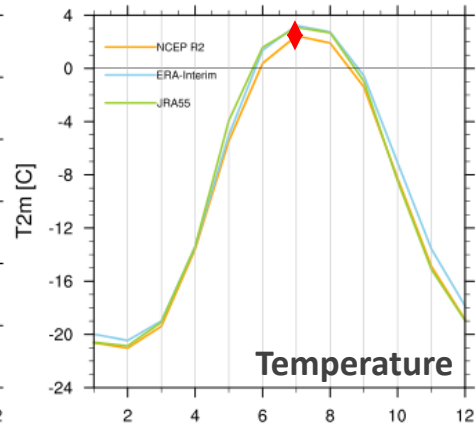
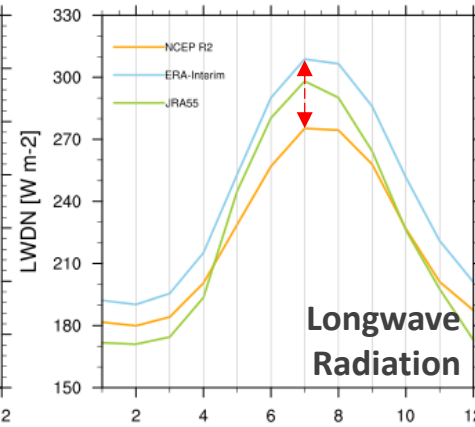
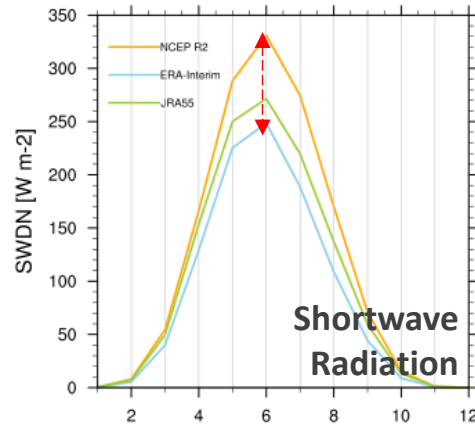


- GNIIP station data
- NCEP R2
- ERA Interim
- JRA-55

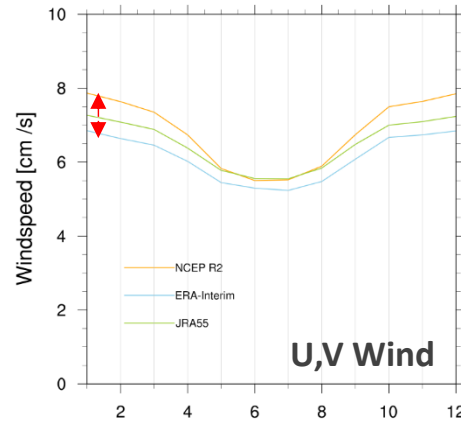
Atmospheric forcing

1991-2014 평균

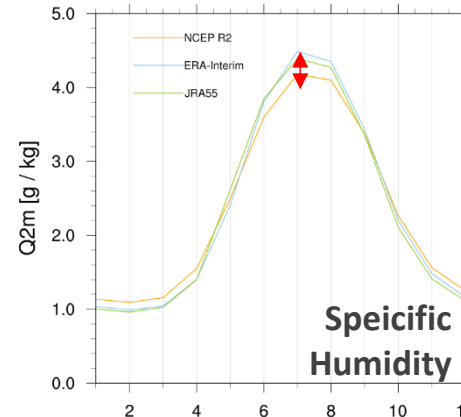
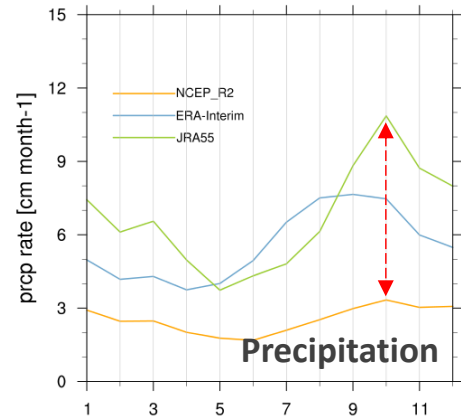
Thermo-
dynamical
Forcing



Dynamical
Forcing



Hydrological
Forcing



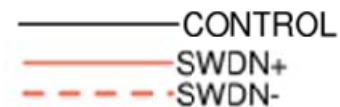
- NCEP R2
- ERA-Interim
- JRA-55

CICE5 atmospheric forcing experiments

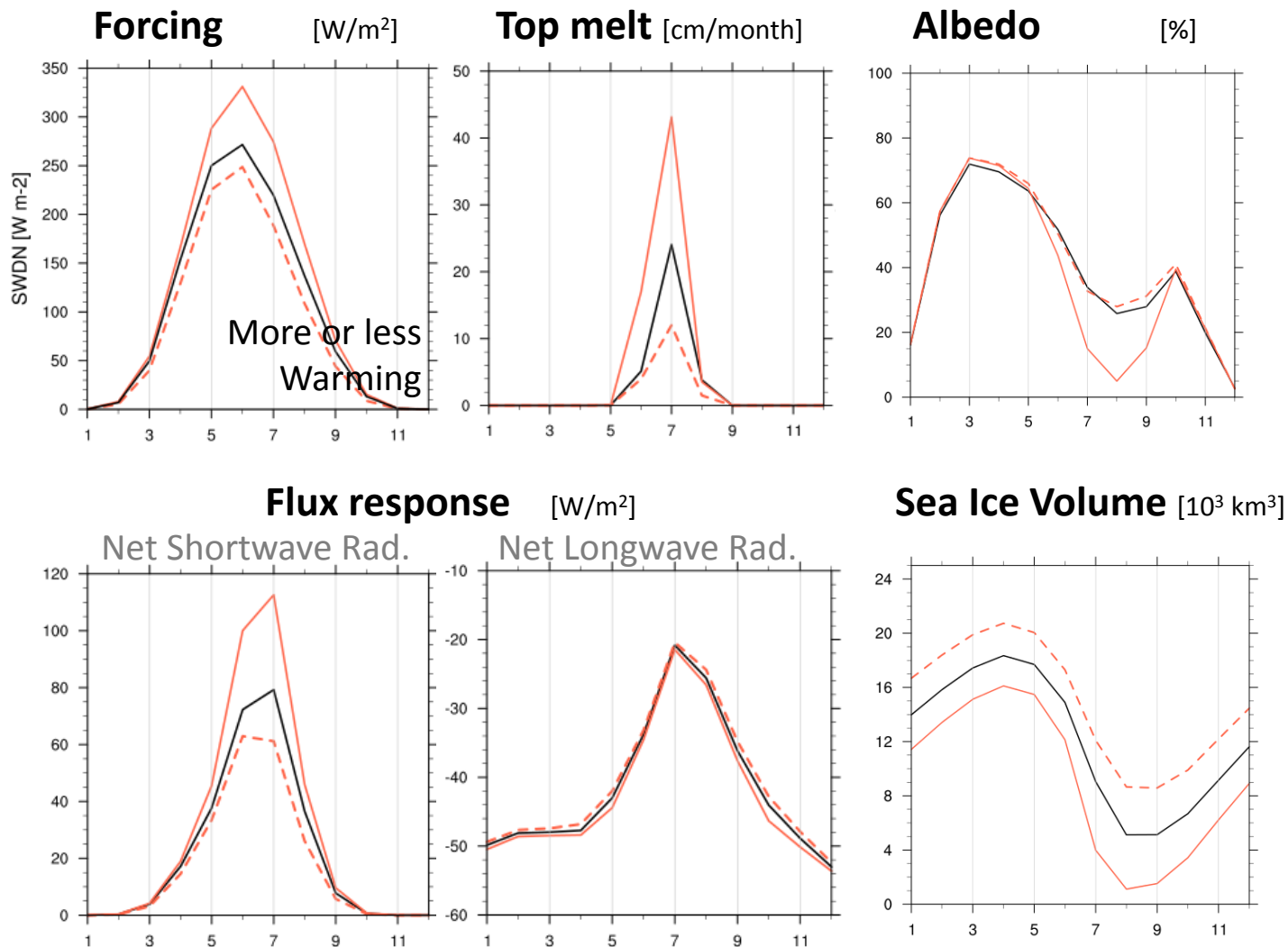
Model	CICE5 stand alone																
Initial Condition	No ICE																
	<ul style="list-style-type: none"> 6 hourly : T,U,V,Q, Air Density Monthly : Downward Longwave Radiation, Downward Shortwave Radiation, Precipitation 																
Atm. Boundary Condition	<table border="1"> <thead> <tr> <th>EXP name</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>CONTROL</td> <td>All variables from JRA-55</td> </tr> <tr> <td>SWDN(+/-)</td> <td>same as CONTROL except downward shortwave radiation (NCEP R2/ERA)</td> </tr> <tr> <td>LWDN(+/-)</td> <td>same as CONTROL except downward longwave radiation (ERA/NCEP R2)</td> </tr> <tr> <td>TEMP</td> <td>same as CONTROL except surface temperature (NCEP R2)</td> </tr> <tr> <td>WIND</td> <td>same as CONTROL except U, V wind (NCEP R2)</td> </tr> <tr> <td>PRCP</td> <td>same as CONTROL except precipitation (NCEP R2)</td> </tr> <tr> <td>HUM</td> <td>same as CONTROL except surface specific humidity (NCEP R2)</td> </tr> </tbody> </table>	EXP name	Description	CONTROL	All variables from JRA-55	SWDN(+/-)	same as CONTROL except downward shortwave radiation (NCEP R2/ERA)	LWDN(+/-)	same as CONTROL except downward longwave radiation (ERA/NCEP R2)	TEMP	same as CONTROL except surface temperature (NCEP R2)	WIND	same as CONTROL except U, V wind (NCEP R2)	PRCP	same as CONTROL except precipitation (NCEP R2)	HUM	same as CONTROL except surface specific humidity (NCEP R2)
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Ocn. Boundary Condition	Monthly HadISST, default SSS																
Dynamics	EAP (Elastic-Anisotropic-Plastic)																
Thermodynamics	Mushy																
Integration Period	1982-2014																

해빙의 용융에 기여한 요소

열역학적 경계조건 (SWDN+/-)



$$F_{atm_to_ice} = F_{LW} + F_{SW} + F_{sens} + F_{lat}$$

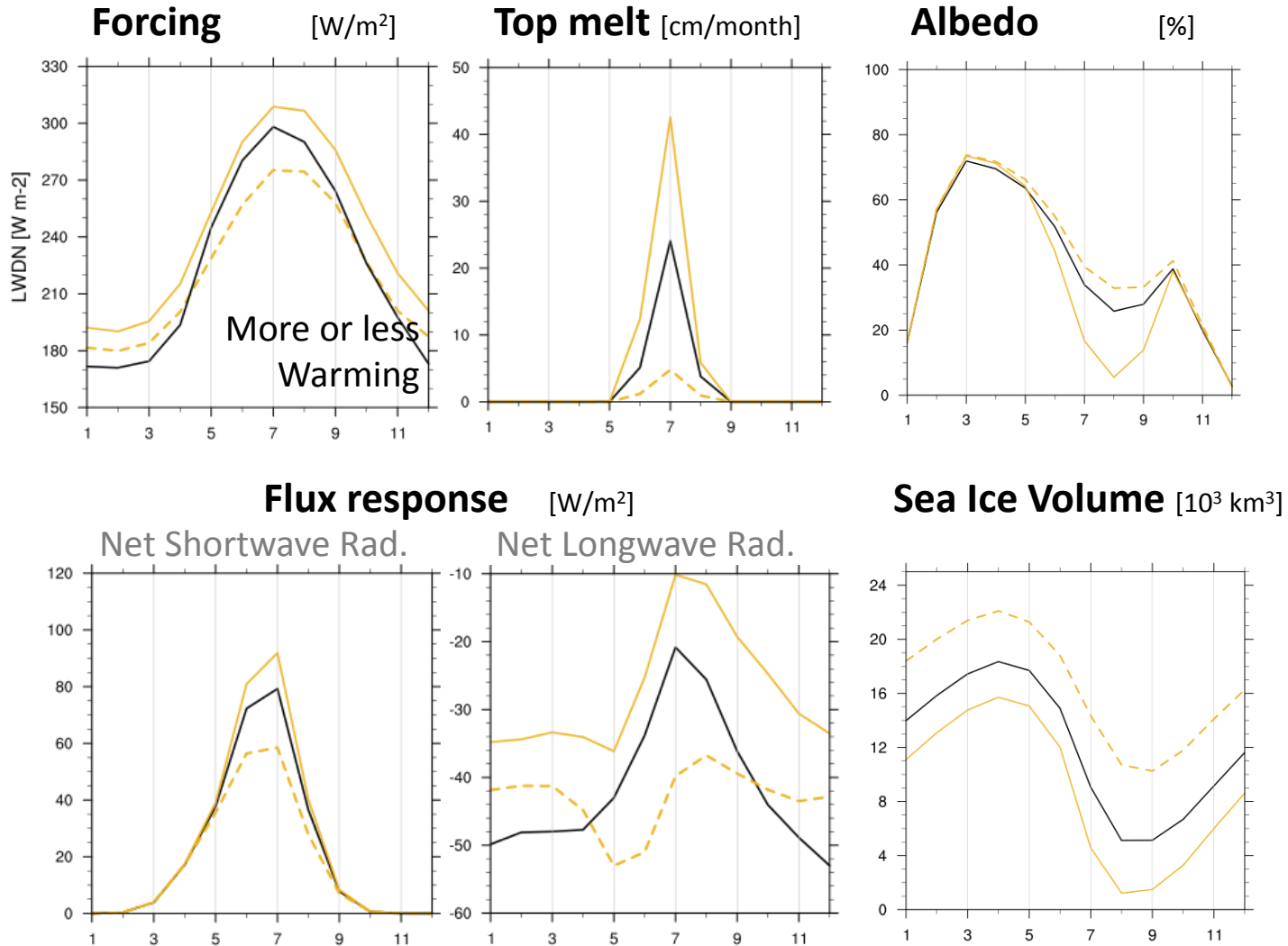


해빙의 용융에 기여한 요소

열역학적 경계조건 (LWDN+/-)

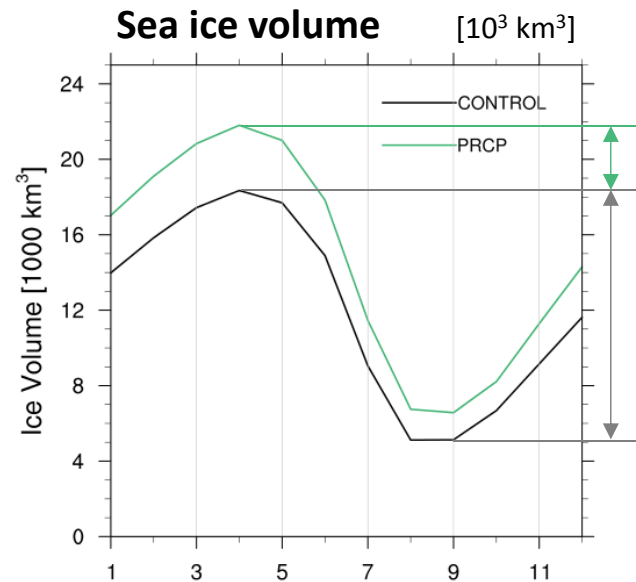
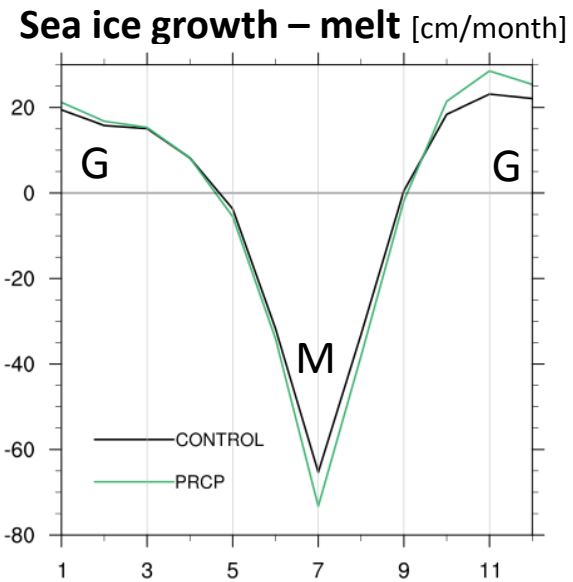
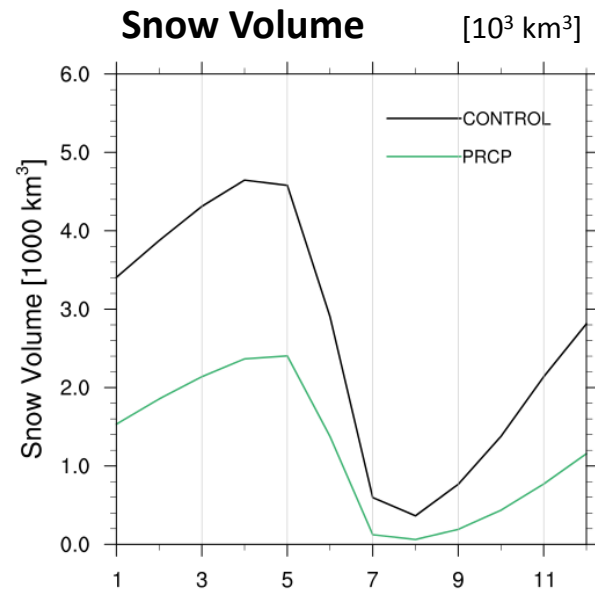
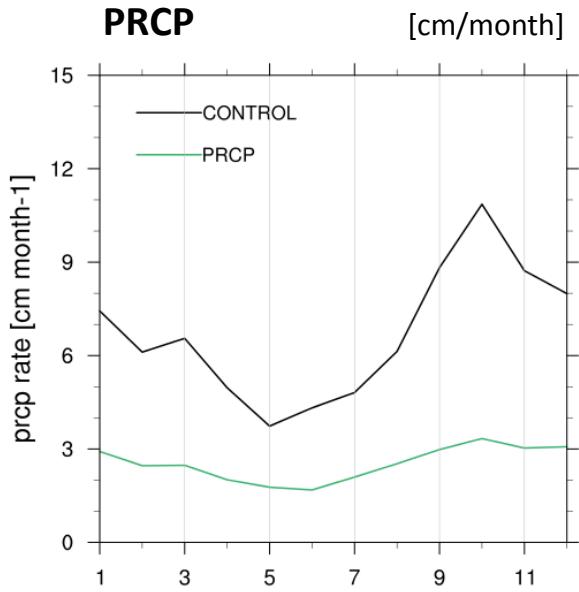


$$F_{atm_to_ice} = F_{LW} + F_{SW} + F_{sens} + F_{lat}$$



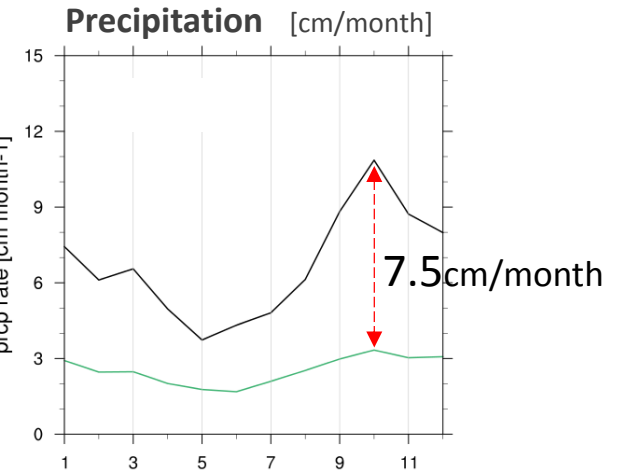
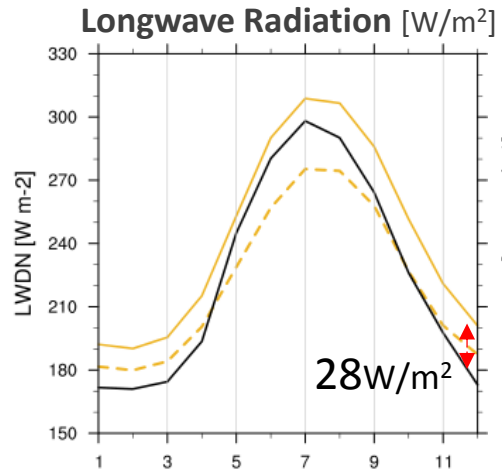
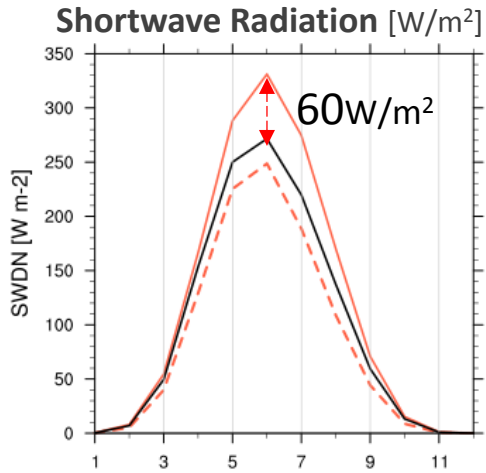
해빙의 계절 변동성

PRCP 실험 결과 해석

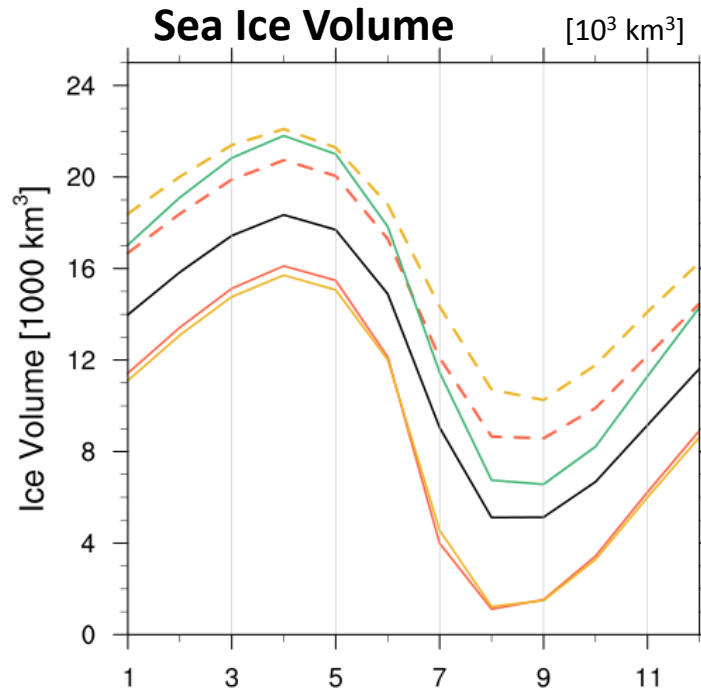


Summary

Forcing



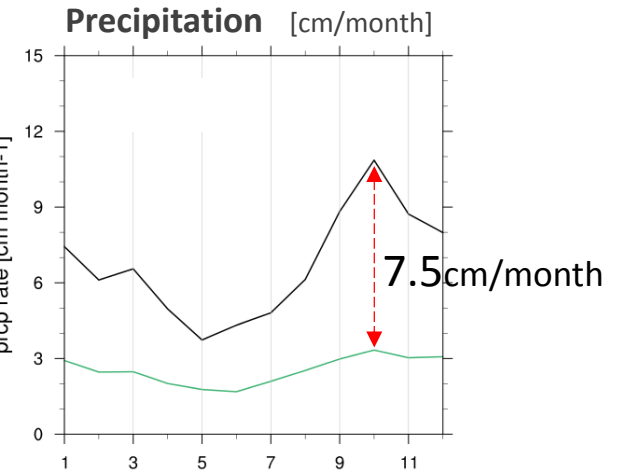
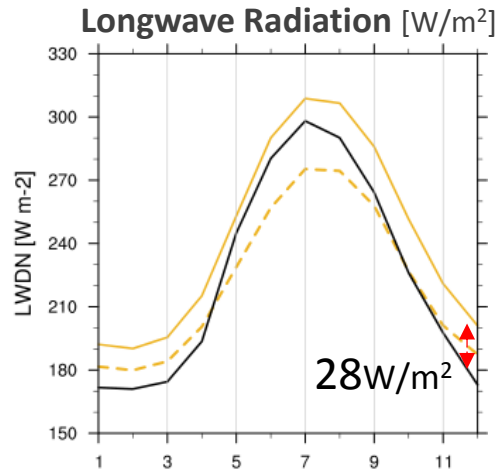
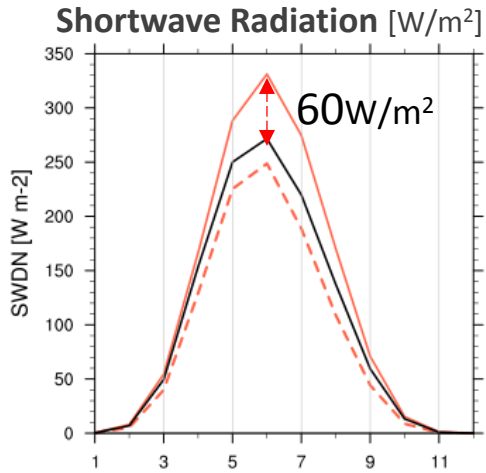
Model results



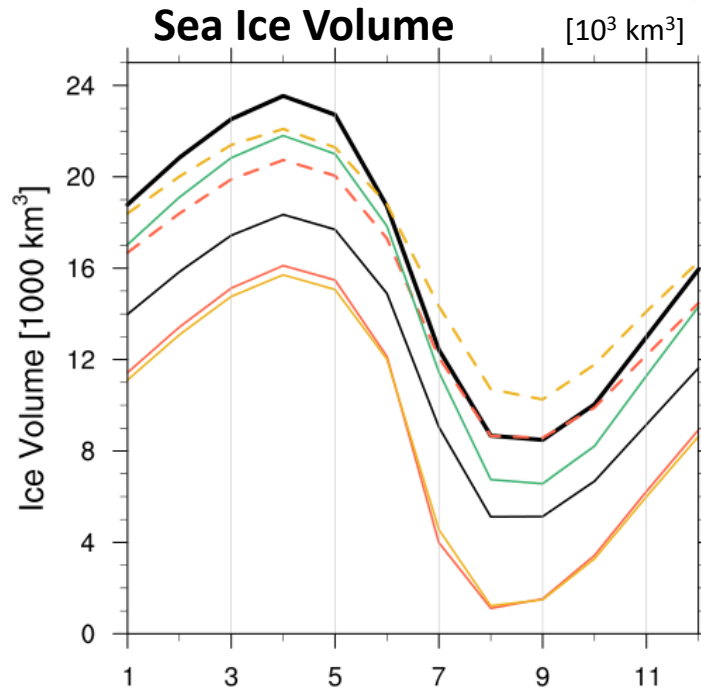
- CONTROL
- SWDN+
- - SWDN-
- LWDN+
- - LWDN-
- PRCP

Summary

Forcing



Model results



- PIOMAS
- CONTROL
- SWDN+
- SWDN-
- LWDN+
- LWDN-
- PRCP