2011 FALL AGU MEETING
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Title : Weekly Cycle of Lightning and Associated Patterns of Rainfall, Cloud, and Aerosols over Korea and Adjacent Oceans during Boreal Summer.

By Ji-In Kim (WEST) and Kyu-Myong Kim (Morgan State Univ)

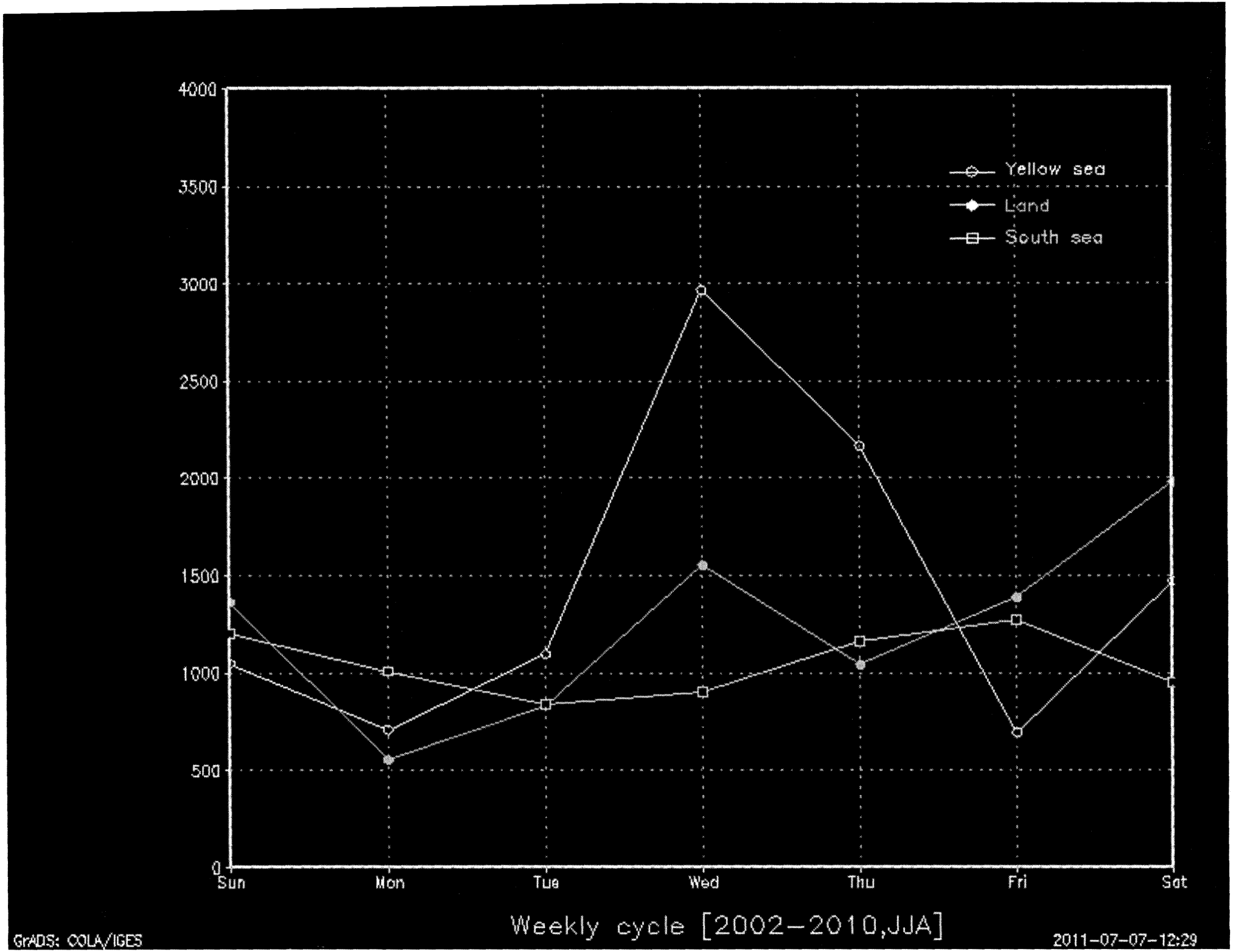
Abstract:

In this study, we analyze the weekly cycle of lightning over Korea and adjacent oceans and associated variations of aerosols, clouds, precipitation, and atmospheric circulations, using aerosol optical depth (AOD) from the NASA Moderate resolution Imaging Spectroradiometer (MODIS) and Multi-angle Imaging SpectroRadiometer (MISR), cloud properties from MODIS, precipitation and storm height from Tropical Rainfall Measuring Mission (TRMM) satellite, and lightning data from the Korean Lightning Detection Network (KLDN) during 9-year from 2002 to 2010. Lightning data was divided into three approximately equal areas, land area of Korea, and two adjacent oceans, Yellow Sea and South Sea.

Preliminary results show that the number of lightning increases during the middle of the week over Yellow Sea. AOD data also shows moderately significant midweek increase at about the same time as lightning peaks. These results are consistent with the recent studies showing the invigoration of storms with more ice hydrometeors by aerosols, and subsequently wash out of aerosols by rainfall.

Frequency of lightning strokes tend to peak at weekend in land area and over South Sea, indicating local weekly anomalous circulation between land and adjacent ocean. On the other hand, lightning frequency over Yellow Sea appears to have very strong weekly cycle with midweek peak on around Wednesday. It is speculated that the midweek peak of lightning over Yellow Sea was related with aerosol transport from adjacent land area. AOD data also suggests midweek peak over Yellow Sea, however, the weekly cycle of AOD was not statistically significant.

Changes in weekly cycle of lightning from pre-monsoon to monsoon season, as well as associated clouds and circulation patterns are also discussed.


4000
3500
3000
2500
2000
1500
1000
500
0
Sun
Mon
Tue
Wed
Thu
Fri
Sat
Yellow sea
Land
South sea
Weekly cycle [2002-2010,JJA]
GrADS: COLA/IGES
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