Micro Squall Line in Belém Region

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Squall Lines: 2000 to 2006

According to Kousky (1980), when the cumulonimbus develops from sea breeze in the coast it organize as a line of convective clouds, it can propagate inside the land as a squall line.

These squall lines have large dimensions of about thousands kilometers and therefore is easily viewed in satellite image and it can be classified having a space scale like a system of the synoptic scale.
Number of cases observed during the Chuva campaign

20 Squall Lines – June, 7 to 30 2011.
1 Squall Line and 2 Micro Squall Lines

Parallel to Marajo Bay (MSLP)
June, 9 2011 16:03UTC

Transversal to Marajo Bay (MSLT)
June, 9 2011 21:53UTC
The aim of this paper is to study this new type of squall Line, trying to find its morphology and to understand the relationship of such convective band with the classic Squall Line.

- Average characteristics of the micro lines (FORTRACC).
- Understand the relationship with the classic Squall Line.
- Possible mechanisms of formation (modeling).
Distribution of Micro-Squall Lines in Belem

Parallel to Marajo Bay (MSLT)
Transversal to Marajo Bay (MSLP)

• 20 Squall Lines (9 CSL, 4 SL1 and 4 SL2)
• 21 cases of MSL (5 MSLP and 16 MSLT)
• 16 MSL was observed in day with Squall Line
• 5 MSL occurred in absence of Squall Line
• Two cases MSL same day (June, 8, 9, 19, 21 and 27)
• Average lifetime for MSL = 1h:50min
  • MSLP = 50 min
  • MSLT = 2h:20min

• MSLP had its formation earlier (from 15 to 19:30 UTC)

• MSLT (between 17:30 and 23UTC)

• a case of the MSLT overnight (04UTC).
Propagation velocity (m/s) of the Micro-Squall Lines

**Transversal to Marajo Bay (MSLT)**

**Parallel to Marajo Bay (MSLP)**

**Velocity (m/s)**

Average speed = 7 m/s

MSLP = 6 m/s

MSLT = 8 m/s

SL1 = 12 m/s

SL2 = 16 m/s
Distance (km) traveled by the Micro-Squall Lines

Mean distance traveled = 57.63km
MSLP = 42km
MLST = 62 km

Maximum for SL2 = 2000 km
Some differences

Micro Squall Line (MSL)
• Length = 150km
• Average lifetime = 1h:50min

Classical Squall Line (SL)
• Length = 1500km
• Average lifetime = 9, 12 e 16 hours for CSL, SL1 and SL2, respectively.

• MSL is Meso β scale
• SL is meso α scale
micro-squall-line 2011-06-09 1734 UTC

GrADS: COLA/IGES

2012-09-21-11:34
1 Squall Line and 2 Micro Squall Lines
## Rainfall (mm)

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<th>DTCEA</th>
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<tr>
<td>MSLT</td>
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<td>0</td>
<td>1.524</td>
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Preliminary Conclusions

• Generally, these systems are embedded in clouds that belong to classical Squall Lines which are observed on satellite image as a single convective organization.

• Moreover, it seem to have a series of pulses of precipitation, giving an idea of existence of another scale internal of the organization.