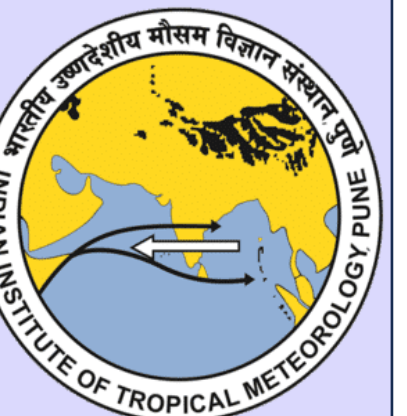


Recent Decadal Changes in the Characteristics of Low pressure Systems over Bay of Bengal



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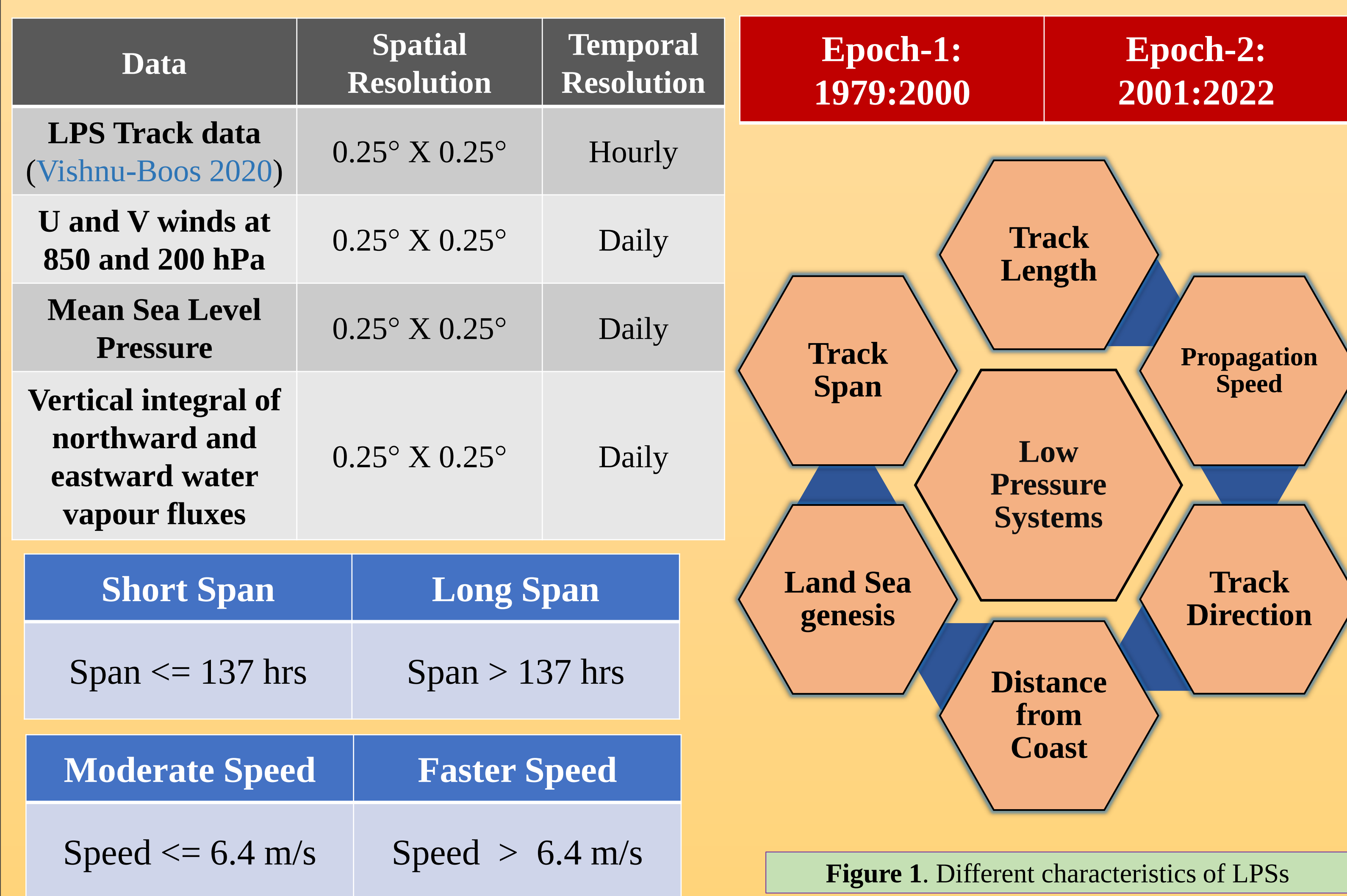
INTRODUCTION

- Previous studies have extensively examined multiple aspects of LPSs like **dynamical, thermodynamical, structural** and its association with **hydrometeorological** and large-scale phenomena (Hunt et.al, 2016).
- A few studies have emphasized on the characteristics of the LPSs, Primarily on **frequency, track length, track density** etc. (Deoras et al. 2021; You & Ting et al. 2021)
- Changes in **propagation speed, track span, direction, , genesis location, track length**, and other characteristics across different epochs are not well investigated.

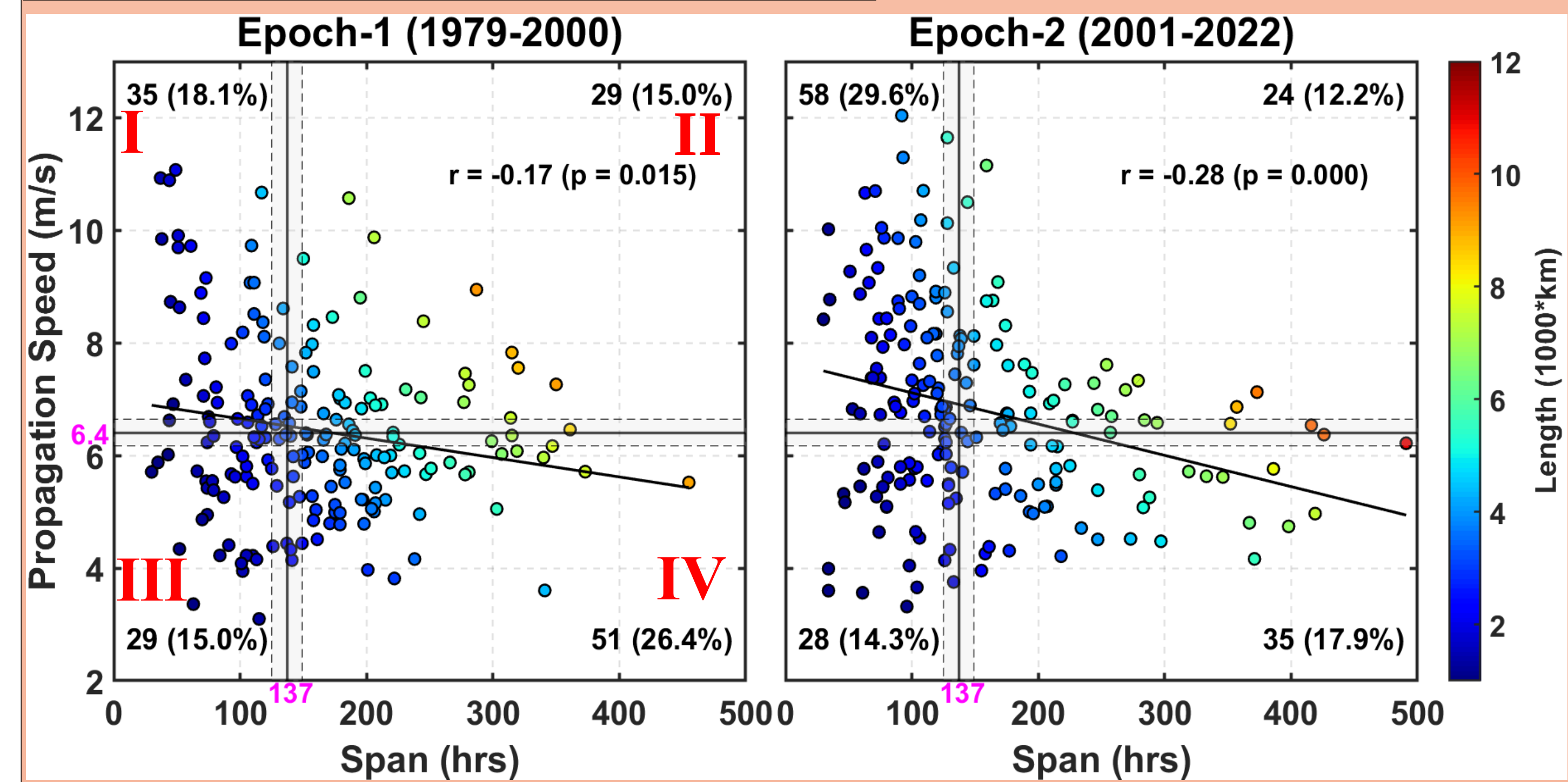
OBJECTIVE:

Does the characteristics of LPSs changed in the recent decades, and what large-scale processes are associated with these changes?

DATA & METHODOLOGY

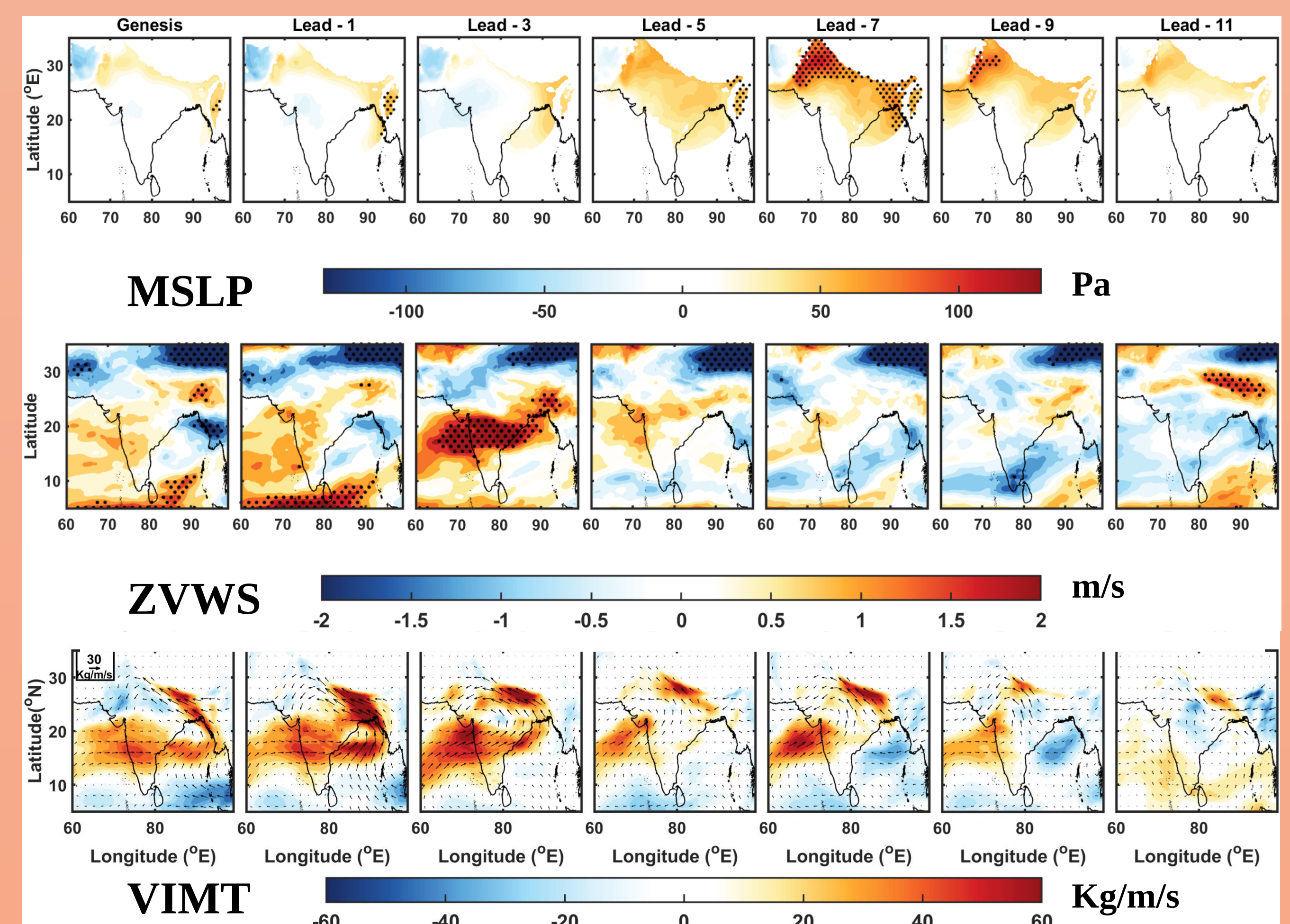


c) Scatter plot of Speed vs Span Epoch-wise:



- Both epochs show a statistically significant but **weak negative correlation**, with a **stronger relationship** in EP2.
- Short-span** systems with **faster propagation speeds** have **increased**, while **long-span** systems with **slower propagation speeds** has **decreased**.
- EP1 shows no distinct pattern, whereas **EP2** exhibits a **rectangular-hyperbolic pattern**.

d) Epochal Difference (EP₂ – EP₁) of Environmental parameters:



- MSLP increases** during the first few days **after genesis** in recent years, which could lead to **limiting LPS sustenance**.
- Meanwhile **Zonal Vertical Wind Shear** shows an **increase** in the **first few days** and subsequently decreases. suggesting enhanced shear, in initial days, might suppress sustenance in the recent years.
- VIMT increases** during the **initial days** and gradually **weakens thereafter**, indicating **enhanced moisture transport early** and cutoff eventually could lead to decrease in the LPS span.

CONCLUSIONS

- The recent **increase** in **short-span** systems is accompanied by changes in **propagation characteristics**, including an increasing **shift** toward N–NW direction and a reduction in N–NE.
- The relationship between **propagation speed** and LPS **span** has also changed, with recent systems **increasingly characterized** by shorter lifetimes and relatively **higher propagation speeds**.
- Recent years show **increased MSLP** and **zonal VWS** during the early days, while **VIMT** is **enhanced initially** and **weakens** with time, suggesting changes in the **early-stage environment** that could **influence LPS evolution**.

REFERENCES

- Deoras, A., Hunt, K.M., Turner, A.G.: The four regional varieties of south Asian monsoon low-pressure systems and their modulation by tropical intraseasonal variability. *Weather* 76(6), 194–200 (2021)
- You, Y., Ting, M.: Observed trends in the south Asian monsoon low-pressure systems and rainfall extremes since the late 1970s. *Geophysical Research Letters* 48(9), 2021–092378 (2021).
- Hunt, K.M., Turner, A.G., Inness, P.M., Parker, D.E., Levine, R.C.: On the structure and dynamics of Indian monsoon depressions. *Monthly Weather Review* 144(9), 3391–3416 (2016)

