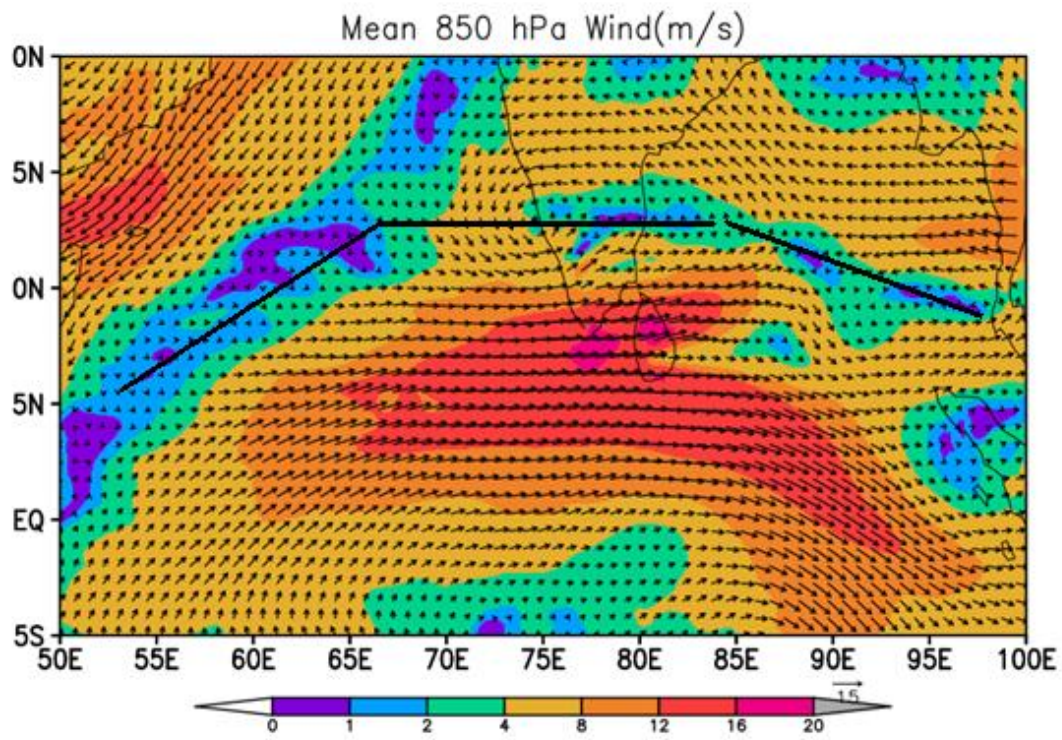


(C)

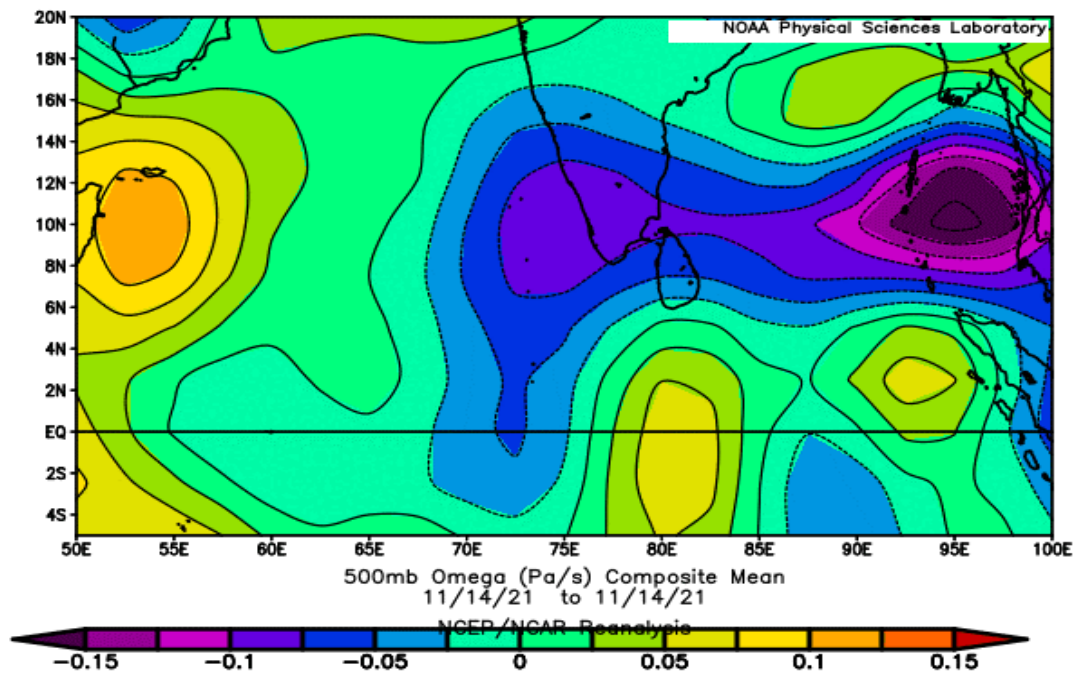
Fig. 4.1. a) 850 hPa streamline analysis during 26-30 Oct, 2018 b) Isobaric analysis on 31 Oct, 2018 and c) average rainfall (mm/day) during 31 Oct to 05 Nov, 2018.

4.2. Upper air east-west trough

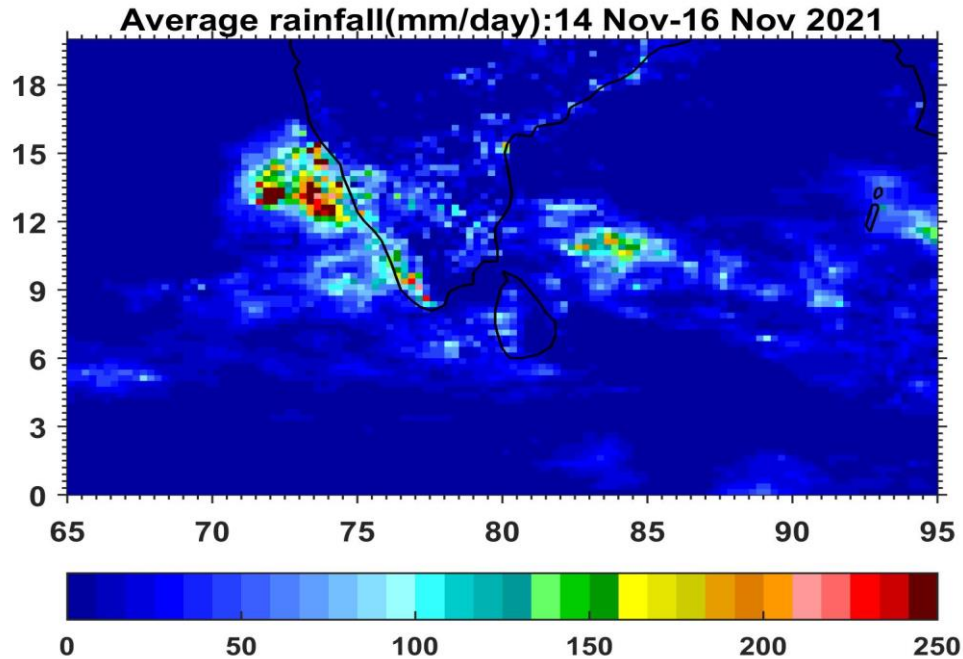
During the NE Monsoon season, occurrence of an east-west trough across the south peninsula is very common. This could be associated with the presence of ITCZ over the region. One good example of the east-west trough is shown in Fig. 4.2 a-c. During 14-16 Nov 2021, an east-west trough was present passing across the south peninsula. The east-west trough provides large scale convergence and associated rainfall activity over the region, as seen in the vertical velocity (ω) shown in Fig. 4.2 b. Associated with this east-west trough large scale rainfall activity was observed over the south Peninsula and the Arabian sea.



(a)



(b)



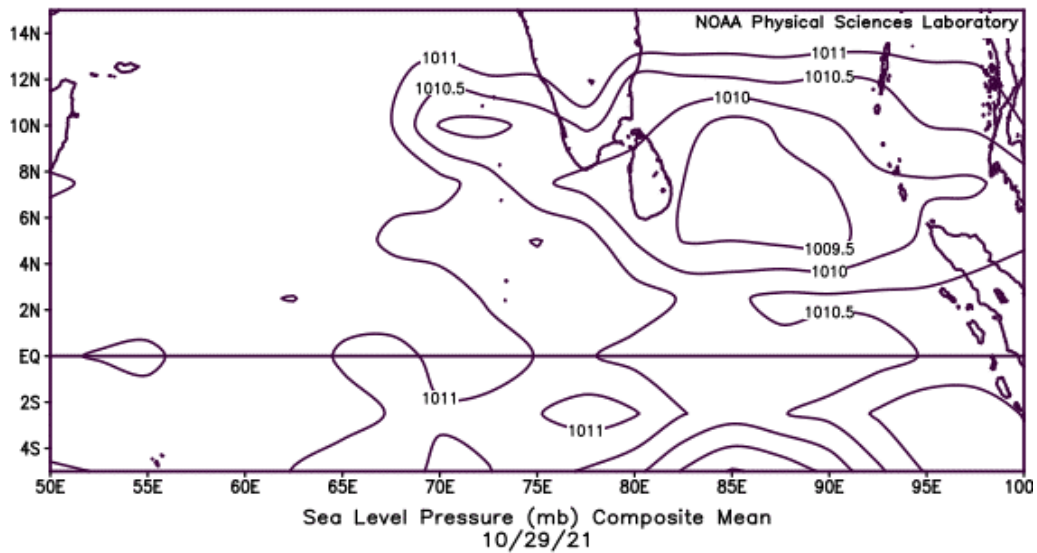
(c)

Fig. 4.2. a) 850 hPa winds on 14 Nov showing the east-west trough (shown as black line) and b) vertical velocity (ω) (Pa/s) at 500 hPa on 14th Nov and c) the cumulative rainfall during 14-16 Nov 2021.

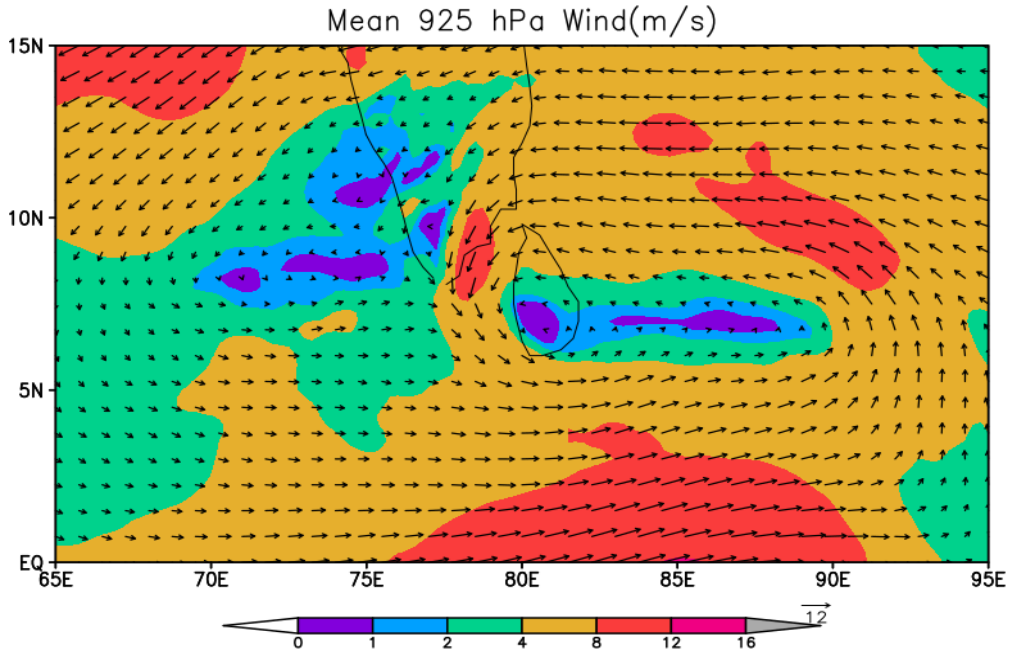
4.2. Low Pressure Area (LOPAR) : 27 Oct - 04 Nov 2021

A low pressure formed over the central parts of south Bay of Bengal and associated cyclonic circulation extending up to 5.8 km above mean sea level on 27th Oct 2021. It lay over the southwest Bay of Bengal off Sri Lanka coast and associated cyclonic circulation extended up to 3.1 km above mean sea level on 28th; over southwest Bay of Bengal off Sri Lanka and Tamil Nadu coast and associated cyclonic circulation extended up to 3.1 km on 29th, 30th and 31st. It lay over the Comorin area and adjoining north Sri Lanka coast extending up to 3.1 km on 01st Nov; over the Comorin area and neighborhood on 02nd and over Lakshadweep area and neighborhood extending up to 4.1 km above mean sea level on 03rd and extending up to 4.5 km on 04th Nov 2021.

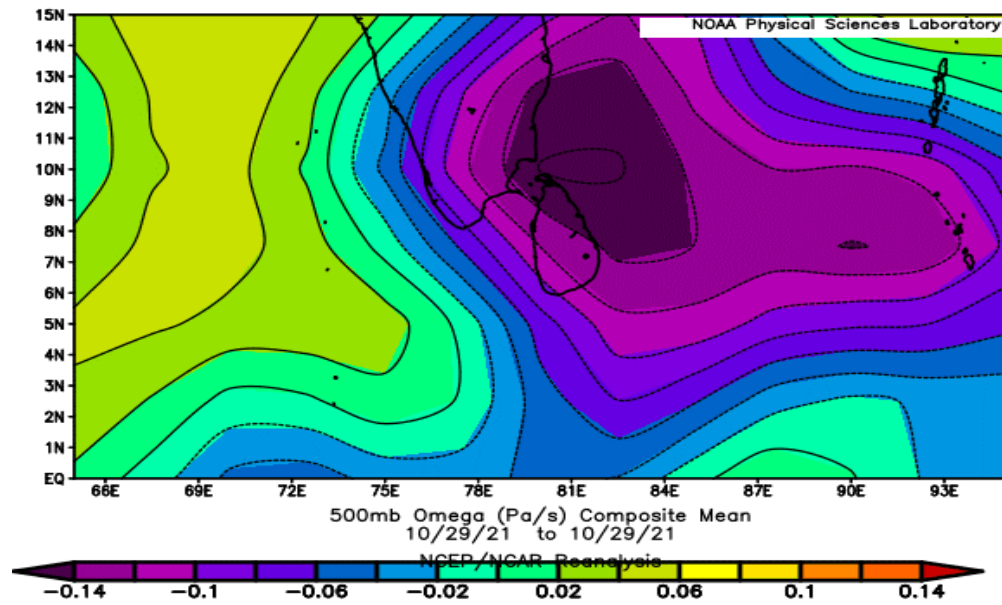
Various dynamical and thermodynamical features of the LOPAR are shown in Fig. 4.3. The Low pressure area was observed off Sri Lanka Coast with an east-west trough of low pressure from the east Arabian sea to the east Bay of Bengal across the low pressure system. At 925 hPa level, the east-west trough is easily seen. The OLR spatial pattern suggests large scale convection of deep clouds with low OLR (less than 200 Wm^{-2}) over the south peninsula and adjoining Bay of Bengal. The Chennai DWR image as well as the Satellite image are also shown below, which suggests large scale clouding over the region. The cumulative rainfall from 01-04 Nov is shown in Fig. 4.3 c. The spatial pattern suggests heavy rainfall exceeding 200 mm/day off the Tamil Nadu coast. Formation of a low pressure area with associated vertical extension over the seasonal east-west trough of low pressure is a regular synoptic system contributing to seasonal rainfall over the south Peninsula. The present day NWP models have capability in predicting the formation of these low pressure systems over the Bay of Bengal, at least 2-3 days in advance. Therefore, early warnings for adverse weather due to the low pressure systems are feasible.



(a)

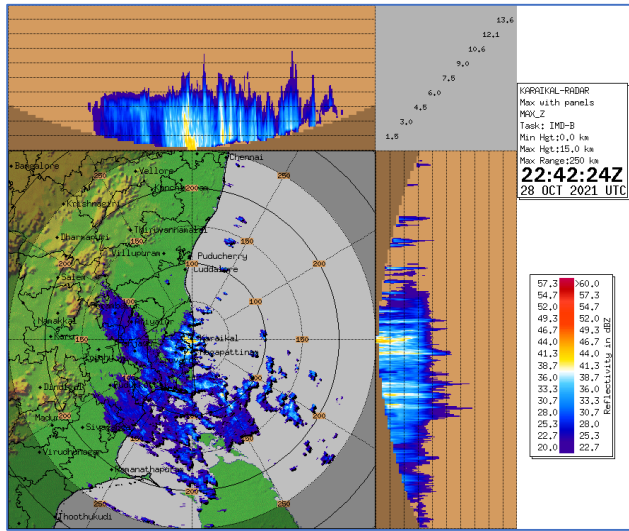


(b)

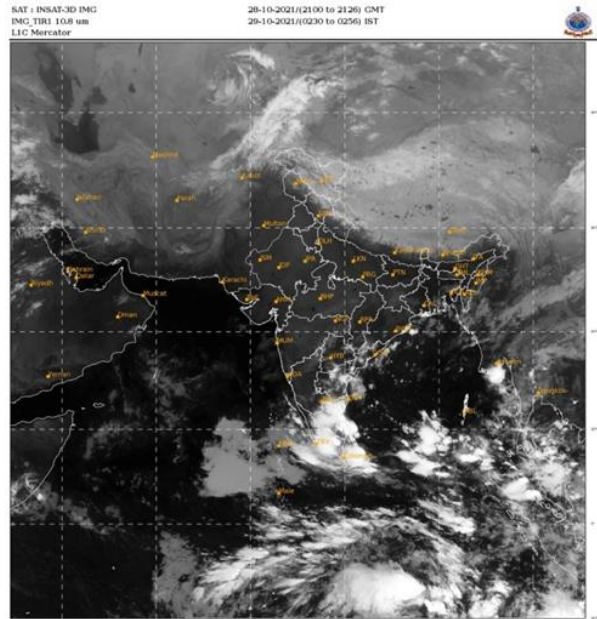


(c)

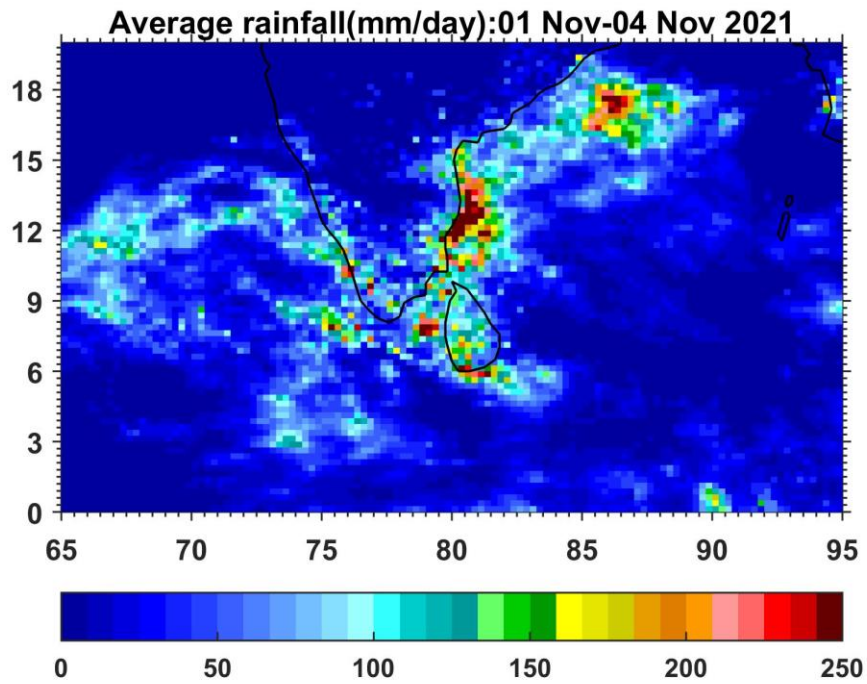
Fig. 4.3. Various dynamic and thermodynamic features of the LOPAR a) Mean Sea Level Pressure b) 925 hPa winds c) vertical velocity (omega) at 500 hPa on 29 Oct 2021



(d)



(e)



(f)

Fig. 4.3. d) DWR image on 28th Oct e) Satellite Image on 29th Oct and f) Cumulative Rainfall during 01-04 Nov 2021.