Ozone in the mid-latitudes of Northern Hemisphere is sensitive to dynamical effects. Ozone vertical profiles by balloon-borne ozonesondes with electrochemical concentration cell (ECC) display narrow layers of increased or depressed ozone in the lower stratosphere of the mid-latitudes during winter and spring. Although the laminated ozone structures in the lower stratosphere have been observed since 1970s, the mechanism for their formation is still uncertain.

In this study, the positive and negative laminae structures in ozone profiles of eight ozonesonde stations from European and Middle East mid-latitudes were examined. New analysis of the variations in the vertical distribution of ozone for latitudes $32^\circ$N and higher, for the period 1997-2009 including ozone recovery was presented. The relationship between the total ozone content of high laminae days and Arctic Oscillation (AO), and North Atlantic Oscillation (NAO) indices were examined seasonally for each station.

The results present that the overall ozone content in laminae has a strong seasonal variation with a maxima in late winter and early spring. The variations in ozone content of laminae were found to correspond to total column ozone variation and laminae seems to contribute to seasonal increase of trends in total ozone. The structure was found to be mostly affected by jet winds and polar vortex. The impact of Arctic Polar vortex of ozone content in the laminae profiles was assessed. The findings were similar to the earlier studies in Europe. The results were slightly different for eastern stations Ankara (Turkey) and Isfahan (Iran).