



EFFECTS OF NATURAL PERTURBATIONS ON CIRRUS CLOUDS

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In this study we examine on a global scale the variability of the cirrus cloud cover that can be attributed to known large-scale natural phenomena such as ENSO, QBO and the NAO. Cirrus clouds are also examined as for their relation with deep convective systems, tropopause temperature and the vertical velocities. The analysis is based on the latest version of the ISCCP D2 cloud dataset and covers the period 1984-1998. The vertical velocity and tropopause temperature were taken from the NCEP/NCAR reanalysis dataset, which is based on combined surface and satellite observations. Cirrus and convective cloud data from the ISCCP were found to be consistent with vertical velocities from the independently produced NCEP dataset. The effect of ENSO, QBO and NAO has been examined separately. Over certain latitudinal belts ENSO, QBO and NAO fluctuations were found to explain significant part of the cloud variability. While QBO was found to have a negligible effect on cirrus clouds, the effect of ENSO and NAO is more significant and can be very important regionally. Cirrus clouds and ENSO are significantly correlated mainly in the tropics. During a warm (El Nino) event, cirrus clouds increase over the east tropical Pacific ocean and decrease over its western part. The correlation between cirrus and NAO was found to be significant mainly over Europe suggesting that during a positive NAO phase, cirrus clouds tend to increase over the northern Europe and to decrease as we move to the south. Concerning regional and global cirrus cloud trends, our findings are consistent with past studies using satellite and ground-based observations.