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Supercold pockets in the Martian mesosphere

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The SPICAM experiment onboard Mars Express has produced to date more than 600 stellar occultation sequences yielding atmospheric transmission in the UV from 10 to 120 km. In this spectral range, CO2 is strongly absorbing and its concentration profile can be easily retrieved by spectral inversion. Using standard hydrostatic equilibrium, vertical distribution of CO2 concentration yields temperature profile. More than 400 profiles have been obtained this way from SPICAM stellar occultation data for more than a Martian year and with a good spatial coverage. One of the most striking features emerging from this dataset is the frequent occurrence ($\sim$10% of cases) of vertical portions of the atmosphere exhibiting temperature well below CO2 condensation point. Seasonal and latitudinal distribution of these mesospheric supercold pockets will be presented and discussed in the context of GCM results.