Altitude-dependent nitrogen concentrations in Venus’ atmosphere

- On 5 June 2007, the Mercury-bound MESSENGER spacecraft flew by the planet Mercury.
- MESSENGER neutron spectrometer measurements during this flyby provided the first measurement of the nitrogen content of Venus’ atmosphere at altitudes between 60 and 100 km.
- Our result, $5.0 \pm 0.4 \%$ N$_2$ by volume, is significantly higher than the value of 3.5% N$_2$ reported for the lower atmosphere (<50 km altitude).
- Our discovery of altitude-dependent variations in the N$_2$ content of the atmosphere defies early expectations of homogeneous composition below 100 km.

Neutron count rates vary with altitude and Venus’ nitrogen content. Colored-curves are modeled rates vs. N$_2$ concentration.