

# 南半球オゾンの 3 次元分布に寄与するプラネタリー波と総観規模擾乱について

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## On the planetary and synoptic scale waves affecting three dimensional distribution of ozone in Southern Hemisphere

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It is known that the distribution of extratropical column ozone is modulated with tropical convections (Hitchman and Rogal 2010a). This modulation is recognized as the 10–20 day-scale responses including "Tropical convective outflow into the upper troposphere and lower stratosphere", "amplification of subtropical anticyclone associated with transport of low potential vorticity" and "modulated synoptic scale disturbances in extratropical regions". On the other hand, it is suggested that planetary scale disturbances influence the distribution of extratropical column ozone. However, this is yet to be identified. The present study examines three dimensional structure of planetary and synoptic scale wave activities from upper troposphere to stratosphere using the formulae describing wave-mean interaction in three dimensions and analytical techniques derived by Kinoshita and Sato (2013a, 2013b), Sato et al. (2013). Moreover, we discuss the relation between their waves and three dimension of ozone.

熱帯域の対流活動が、南半球中高緯度域のオゾン分布に影響を与えることが知られている (Hitchman and Rogal 2010)。この現象は、「熱帯域の対流に伴う上部対流圏の極向きの流れ」、「角運動量の極向き輸送に伴う亜熱帯ジェット強化」、「中高緯度における総観規模擾乱活動の変調」といった 10–20 日スケールの応答によるものと考えられている。一方で、プラネタリースケールの擾乱活動の寄与も示唆されているが、それに伴う物質輸送の 3 次元分布等まだ確認されていないことも多い。そこで本研究では、Kinoshita and Sato (2013a, 2013b)、Sato et al. (2013) により導出された波活動とそれに伴う物質輸送を 3 次元に記述可能な方程式系と解析手法を用い、南半球中高緯度域の準停滞性プラネタリー波と総観規模擾乱活動の 3 次元構造及び、トレーサの輸送方程式を用いて両者がオゾン分布に与える影響について調べた結果を報告する。

### References

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