Ozonesonde observations of the gravity waves in the stratosphere

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An analysis was made to reveal the effect of gravity waves on the stratospheric ozone with the aid of ozonesonde observations. Since the photochemical lifetime of ozone is much longer (several months to a year) than the periods of the gravity waves (less than a day) in the lower stratosphere, ozone fluctuations are mainly induced by the transport by atmospheric motions, such as gravity waves. On the other hand, photochemical equilibrium is realized in the upper stratosphere since the photochemical lifetime of ozone in this region is short (one hour). At the altitudes of 30-40km, the gravity waves with the periods of several hours can affect the production and loss of ozone through the horizontal and vertical transport and photochemical reactions due to temperature fluctuations. In the regions where gravity waves were observed, vertical profiles of ozone and temperature were investigated to reveal the effect of the horizontal and vertical transport and photochemical reactions induced by gravity waves on the ozone fluctuations.