

## Literatur

- Alexander, M. J., and Vincent, R. A., Gravity waves in the tropical lower stratosphere: a model study of seasonal and interannual variability, *J. Geophys. Res.*, 14, 17983-17993, 2000.
- Allen, S. J., Gravity wave motions in the troposphere and lower stratosphere, Dissertation, University of Adelaide, Australia, 1996.
- Allen, S. J., and Vincent, R. A., Gravity wave activity in the lower atmosphere: seasonal and latitudinal variations, 100, 1327-1350, 1995.
- Andrews, D. G., Holton, J. R., and Leovy, C. B., Middle atmosphere dynamics, Academic Press, Orlando, 1987.
- Andrews, D. G., An introduction to atmospheric physics Cambridge: Univ. Press, 2000.
- Barnett, J., and Corney, M., Middle atmosphere reference model from satellite data, Middle atmosphere Program, Handbook for MAP, pp. 47-85, 1985.
- Bath, M., Spectral analysis in geophysics, vol 7, Developments in solid earth geophysics, Elsevier Science, New York, 1974.
- Blackman, R. B., and Tukey, J. W., The measurement of power spectra from the point of view of communications Engineering, Dover Publications, New York, 1958.
- Blumen, W., Geostrophic adjustment, *Rev. Geophys. Space Phys.*, 10, 485-528, 1972.
- Brasseur, G., and Solomon, S., Aeronomy of the middle atmosphere, 2nd ed., Reidel, Dordrecht, Holland, 1984.
- Bretherton, F. P., Momentum transport by gravity waves, *Q. J. R. Meteor. Soc.*, 95, 213-243, 1969a.
- Bretherton, F. P., On the mean motion induced by internal gravity waves, *J. Fluid Mech.*, 36, 785-803, 1969b.
- Brodhun, D., Bull, G. und Neisser, J., Über Schwerewellen bei Kaltfrontdurchgängen, *Z. f. Meteorol.*, 26, NR.4, 211-218, 1976.
- Brunk, I. W., The pressure pulsation of 11 April 1944, *J. Meteor.*, 6, 181-187, 1949.
- Bull, G. und Neisser, J., Häufigkeiten und Amplituden von atmosphärischen Schwerewellen, *Z. f. Meteorol.*, 26, NR.4, 205-210, 1976.

- Chanin, M.-L., and Hauchecorne, A., Lidar observation of gravity and tidal waves in the stratosphere and mesosphere, *J. Geophys. Res.*, 86, 9715-9721, 1981.
- Clark, T. E., Hauf, T., and Kuettner, J. P., Convectively forced internal gravity waves: Results from a two-dimensional numerical experiments, *Q. J. R. Meteorol. Soc.*, 112, 899-925, 1986.
- Desaubies, Y. J. F., Analytical representation of internal wave spectra, *J. Phys. Oceangr.*, 6, 976-981, 1976.
- Dewan, E. M., The saturated-cascade model for atmospheric gravity wave spectra, and the wavelength-period (W-P) relations, *Geophys. Res. Lett.*, 21, 817-820, 1994.
- Dewan, E. M., and Good, R. E., Saturation and the "universal" spectrum for vertical profiles of horizontal scalar winds in the atmosphere, *J. Geophys. Res.*, 91, 2742-2748, 1986.
- Dörnbrack, A., Schmid, H., Simulation of breaking gravity waves during the south foehn of 7 - 13 January 1996, Report 15, Institut für Physik der Atmosphäre, Wessling, DLR, 1998.
- Dunkerton, T. J., On the mean meridional mass motions in the stratosphere and mesosphere, *J. Atmos. Sci.*, 35, 2325-2333, 1978.
- Dunkerton, T. J., Theory of internal gravity wave saturation, *Pure Appl. Geophys.*, 130, 373-397, 1989.
- Dunkerton, T. J., The role of gravity waves in the quasi-biennial oscillation, *J. Geophys. Res.*, 102, 26053-26076, 1997.
- Eckermann, S. D., Effect of background winds on vertical wave number spectra of atmospheric gravity waves, *J. Geophys. Res.*, 100, 14097-14112, 1995.
- Eckermann, S. D., Hodographic analysis of gravity waves: Relationships among Stokes parameters, rotary spectra, and cross-spectral methods, *J. Geophys. Res.*, 101, 19169-19174, 1996.
- Eckermann, S. D., and Vincent, R. A., Falling sphere observations of anisotropic gravity wave motions in the upper stratosphere over Australia, *Pure Appl. Geophys.*, 130, 509-532, 1989.
- Eliassen, A., and Palm E., On the transfer of energy in stationary mountain waves, *Geofys. Publ.*, 22, 1-23, 1961.
- Ferraz-Mello, S., Estimation of unequally spaced observations, *Astron. J.*, 86, 619-624, 1981.
- Fovell, R., Durran, D., and Holton, J. R., Numerical simulation of convectively generated gravity waves, *J. Atmos. Sci.*, 49, 16, 1427-1442, 1992.

- Freuer, Ch., Häufigkeit der Luftmassen und Frontdurchgänge in Berlin-Dahlem 1972-1980, Berliner Wetterkarte 1981, Beil. Nr. 57, 1981.
- Fritts, D. C., Gravity wave saturation in the middle atmosphere: a review of theory and observations, *Rev. Geophys. Space Phys.*, 22, 275-308, 1984.
- Fritts, D. C., Gravity wave sources, source variability and lower and middle atmosphere effects, Coupling processes in the lower and middle atmosphere: proceedings of the NATO Advanced Research Workshop on Coupling Processes in the Lower and Middle Atmosphere, Loen, Norway, May 25 - 30, 1992, E. V. Thrane (Eds.), Dordrecht, Kluwer, NATO ASI series : Ser. C, Mathematical and physical sciences, 387, 1993.
- Fritts, D. C., and Luo, W., Spectral estimates of gravity wave energy and momentum fluxes, part II, Parameterization of wave forcing and variability, *J. Atmos. Sci.*, 50, 3695-3713, 1993.
- Fritts, D. C., and Nastrom, G. D., Sources of mesoscale variability of gravity waves. Part II: Topographic Excitation, *J. Atmos. Sci.*, 49, 111-127, 1992.
- Fritts, D. C., and Vincent, R. A., Mesospheric momentum flux studies at Adelaide, Australia: observations and a gravity wave-tidal interaction model, *J. Atmos. Sci.*, 44, 605-619, 1987.
- Fritts, D. C., and van Zandt, Th. E., Spectral estimates of gravity wave energy and momentum fluxes, part I, Energy dissipation acceleration, and constraints, *J. Atmos. Sci.*, 50, 3685-3694, 1993.
- Fritts, D. C., and Wang, D., Doppler-shifting effects on frequency spectra of gravity waves observed near the summer Mesopause at high latitudes, *J. Atmos. Sci.*, 48, 1535-1544, 1991.
- Gage, K. S., Evidence for a  $k^{5/3}$  power law inertial range in mesoscale two-dimensional turbulence, *J. Atmos. Sci.*, 36, 1950-1954, 1979.
- Gage, K. S., and Nastrom, G. D., On the spectrum of atmospheric velocity fluctuations seen by MST/ST radars and their interpretation, *Radio Sci.*, 20, 1339-1347, 1985.
- Gall, R. L., Williams, R. T., and Clark, T. L., Gravity waves generated during frontogenesis, *J. Atmos. Sci.*, 45, 2204-2219, 1988.
- Garcia, R. R., Stordal, F. und Solomon, S., A new numerical model of the middle atmosphere : Pt. 1, Dynamics and transport of tropospheric source gases, *J. Geophys. Res.*, 97, 12967-12991, 1992.
- Gardner, C. S., and Gardner, N. F., Measurements distortion in aircraft, space shuttle, and balloon observations of atmospheric density, *J. Geophys. Res.*, 98, 1023-1033, 1993.
- Gill, A. E., *Atmosphere-ocean dynamics*, Academic Press, New York, 1982.

- Geller, M. A., Wu, M.-F., and Gelman, M. E., Troposphere-stratosphere (surface-55 km) monthly winter general circulation statistics for the northern hemisphere-four year averages, *J. Atmos. Sci.*, 40, 1334-1352, 1983.
- Gossard, E. E., and Hooke, W. M., Waves in the atmosphere, Developments in atmospheric science, Elsevier Scientific Publishing, Amsterdam, 1975.
- Griffiths, M., and Reeder, M. J., Stratospheric inertia-gravity waves generated in a numerical model of frontogenesis. I: Model solutions, *Q. J. R. Meteorol. Soc.*, 122, 1153-1174, 1996.
- Guest, F. M., Reeder, M. J., Marks, C. J., and Karoly, D. J., Inertia-gravity waves observed in the lower stratosphere over Macquarie Island, *J. Atmos. Sci.*, 57, 737-752, 2000.
- Hamilton, K., Comprehensive meteorological modeling of the middle atmosphere: a tutorial review, *J. Terr. Phys.*, 58, 1591-1627, 1996.
- Hines, C. O., Internal gravity waves at ionospheric heights, *Can. J. Phys.*, 38, 1441, 1960.
- Hines, C. O., The upper atmosphere in motion, American Geophysical Union, 22, 1974.
- Hines, C. O., Doppler-spread parameterization of gravity-wave momentum deposition in the middle atmosphere, Part 1: Basic formulation, *J. Atmos. Terr. Phys.*, 59, 371-386, 1997.
- Hitchman, M. H., Gille, J. C., Rodgers, C. D., and Brasseur, G., The separated polar winter stratopause: A gravity-wave driven climatological feature, *J. Atmos. Sci.*, 46, 410-422, 1989.
- Karoly, D. J., Hope, P., and Jones, P. D., Decadal variations of the southern hemisphere circulation, *International journal of climatology*, 16, 7, 723-738, 1996.
- Kuettner, J., Moazagotl und Föhnwelle, *Beitr. Phys. Freien Atmos.*, 25, 79-114, 1939a.
- Kuettner, J., Zur Entstehung der Föhnwelle, *Beitr. Phys. Freien Atmos.*, 25, 251-299, 1939b.
- Labitzke, K., Temperature changes in the mesosphere and stratosphere connected with circulation changes in winter, *J. Atmos. Sci.*, 29, 756-766, 1972.
- Leutbecher, M., Die Ausbreitung orographisch angeregter Schwerewellen in der Stratosphäre: lineare Theorie, idealisierte und realitätsnahe numerische Simulation Forschungsbericht Deutsches Zentrum für Luft- und Raumfahrt, DLR 17; Köln, 1998.
- Ley, B. E., and Peltier, W. R., Wave generation and frontal collapse, *J. Atmos. Sci.*, 35, 3-17, 1978.
- Lilly, D. K., Wave momentum flux - a GARP problem, *Bull. Amer. Meteor. Soc.*, 53, 17-23, 1972.
- Lilly, D. K., A severe downslope windstorm and aircraft turbulence event induced by a mountain wave, *J. Atmos. Sci.*, 35, 59-77, 1978.

- Lilly, D. K., Stratified turbulence and the mesoscale variability of the atmosphere, *J. Atmos. Sci.*, 40, 749-761, 1983.
- Lilly, D. K., and Kennedy, P. J., Observations of a stationary mountain wave and its associated momentum flux and energy dissipation, *J. Atmos. Sci.*, 30, 1135-1152, 1973.
- Lilly, D. K., and Lester, P. F., Waves and turbulence in the stratosphere, *J. Atmos. Sci.*, 31, 800-812, 1974.
- Lindzen, R. S., Turbulence and stress owing to gravity wave and tidal breakdown, *J. Geophys. Res.*, 86, 9707-9714, 1981.
- Lindzen, R. S., Multiple gravity wave breaking levels, *J. Atmos. Sci.*, 42, 301-305, 1985.
- Lindzen, R. S., and Holton, J. R., A theory of the quasi-biennial oscillation, *J. Atmos. Sci.*, 25, 1095-1107, 1968.
- Manabe, S., and Wetherald, R. T., Thermal equilibrium of the atmosphere with a given distribution of relative humidity, *J. Atmos. Sci.*, 24, 241-259, 1967.
- McFarlane, N. A., The effect of orographically excited gravity wave drag on the general circulation of the lower stratosphere and troposphere, *J. Atmos. Sci.*, 44, 1775-1800, 1987.
- McLandress, C., On the importance of gravity waves in the middle atmosphere and their parameterization in general circulation models, *J. Atmos. Terr. Phys.*, 60, 1357-1383, 1998.
- Medvedev, A. S., Klaassen, G. P., Vertical evolution of gravity wave spectra and their parameterization of associated wave drag, *J. Geophys. Res.*, 100, 25841-15831, 1995.
- Nastrom, G. D., and Fritts, D. C., Sources of mesoscale variability of gravity waves. Part I: Topographic Excitation, *J. Atmos. Sci.*, 49, 101-110, 1992.
- Nastrom, G. D., Van Zandt, T. E., Biases due to gravity waves in wind profiler measurements of winds, *J. Appl. Meteor.*, 35, 243-257, 1996.
- Nastrom, G. D., Fritts, D. C., and Gage, K. S., An investigation of terrain effects on the mesoscale spectrum of atmospheric motions, *J. Atmos. Sci.*, 44, 3087-3096, 1987.
- Nastrom, G. D., Peterson, M. R., Green, J. L., Gage, K. S., and van Zandt, Th. E., Sources of gravity wave activity seen in the vertical velocities observed by the Flatland VHF radar, *J. Appl. Meteor.*, 29, 783-792, 1990.
- Nastrom, G. D., van Zandt, T. E., Warnock, J. M., Vertical wavenumber spectra of wind and temperature from high-resolution balloon soundings over Illinois, *J. Geophys. Res.*, 102, 6685-6701, 1997.
- Naujokat, B. und Marquardt, C., Die annähernd zweijährige Schwingung (QBO), *Promet*, 22, 2/4, 62-68, 1992.

- Ogino, S., Yamanaka, M. D., and Fukao, S., Meridional variation of lower stratospheric gravity wave activity: a quick look at Hakuho-Maru J-COARE cruise rawinsonde data, *J. Meteorol. Soc. Japan*, 73, 407-413, 1995.
- O'Sullivan, D., Dunkerton, T. J., Generation of inertia-gravity waves in a simulated life cycle of baroclinic instability, *J. Atmos. Sci.*, 21, 3695-3716, 1995.
- Palmer, T. N., Shutts, G. J., and Swinbank, R., Alleviation of a systematic westerly bias in general circulation and numerical weather prediction models through an orographic gravity wave drag parameterization, *Q. J. R. Meteor. Soc.*, 112, 1001-1040, 1986.
- Pfister, L., Starr, W., Craig, R., Loewenstein, M., and Legg, M., Small-scale motions observed by aircraft in the lower tropical stratosphere: Evidence for mixing and its relationship to large-scale flows, *J. Atmos. Sci.*, 39, 1498-1529, 1986.
- Pfister, L., Scott, S., Loewenstein, M., Bowen, S., and Legg, M., Mesoscale disturbances in the tropical stratosphere excited by convection: observations and effects on the stratospheric momentum budget, *J. Atmos. Sci.*, 50, 1058-1075, 1993.
- Potter, B. E., and Holton, J. R., The Role of monsoon convection in the dehydration of the lower atmosphere, *J. Atmos. Sci.*, 52, 1034-1050, 1995.
- Press, W. H., Teukolsky, S. A., and Vetterling, W. T., *FORTRAN numerical recipes*, Cambridge, Cambridge Univ. Pr., 1992.
- Preuß, P., Eckermann, S. D., and Offermann, D., Comparison of global distributions of zonal-mean gravity wave variance inferred from different satellite instruments, *Geophys. Res. Lett.*, 27, 3877-3880, 2000.
- Queney, P., The problem of air flow over mountains: a summary of theoretical studies, *Bull. Am. Meteorol. Soc.*, 29, 16-26, 1948.
- Rocken, Ch., van Hove, T.; Ware, R., Near real-time GPS sensing of atmospheric water vapor, *Geophys. Res. Lett.*, 24, 3221-3224, 1997.
- Salby, M. L., *Fundamentals of Atmospheric Physics*, Academic Press, San Diego, 1996.
- Scaife, A. A., Butchart, N., Warner, C., D., Stainforth, D., Norton, W., and Austin, J., Realistic quasi-biennial oscillations in a simulation of the global climate, *Geophys. Res. Lett.*, 27, 3481-3484, 2000.
- Scinocca, J. F., and Peltier, W. R., Pulsating downslope windstorms, *J. Atmos. Sci.*, 46, 2885-2914, 1989.
- Sidi, C., Lefrere, J., Dalaudier, F., and Barat, J., An improved atmospheric buoyancy wave spectrum model, *J. Geophys. Res.*, 93, 774-790, 1988.
- Smith, R. B., The influence of mountains on the atmosphere, *Adv. Geophys.*, 21, 87-230, 1979.
- Smith, R. B., Hydrostatic air flow over mountains, *Adv. Geophys.*, 31, 1-38, 1989.

- Smith, A. K., and Lyjak, L. V., An observational estimate of gravity wave drag from the momentum balance in the middle atmosphere, *J. Geophys. Res.*, 90, 2233-2241, 1985.
- Smith, S. A., Fritts, D. C., and van Zandt, Th. E., Evidence for a saturated spectrum of atmospheric gravity waves, *J. Atmos. Sci.*, 44, 1404-1410, 1987.
- Takahashi, M., Simulation of the stratospheric quasi-biennial oscillation using a general circulation model, *Geophys. Res. Lett.*, 23, 661-664, 1996.
- Tsuda, T., Murayama, Y., Nakamura, T., Vincent, R. A., Manson A. H., Meek, C. E., and Wilson, R. L., Variations of the gravity wave characteristics with the height, season and latitude revealed by comparative observations, *J. Atmos. Terr. Phys.*, 56, 555-568, 1994.
- Turtiainen, H., Response Time of RS80 temperature sensor in flight, technical report, Väisälä Oy, Finland, 1991a.
- Turtiainen, H., Response Time test of Väisälä RS80 temperature sensor, technical report, Väisälä Oy, Finland, 1991b.
- Uccellini, L. W., and Koch, S. E., The synoptic setting and possible energy sources for mesoscale wave disturbances, *Mon. Wea. Rev.*, 115, 721-729, 1987.
- van Zandt, T. E., A universal spectrum of buoyancy waves in the atmosphere, *Geophys. Res. Lett.*, 9, 575-578, 1982.
- van Zandt, Th. E., A model for gravity wave spectra observed by Doppler sounding systems, *Radio Sci.*, 20, 1323-1330, 1985.
- van Zandt, Th. E., and Fritts, D. C., A theory of enhanced saturation of the gravity wave spectrum due to increases in atmospheric stability, *Pure Appl. Geophys.*, 130, 399-420, 1989.
- von Zahn, U., and Bremer, J., Simultaneous and common-volume observations of noctilucent clouds and polar mesosphere summer echoes, *Geophys. Res. Lett.*, 26, 1521-1524, 1999.
- Vincent, R. A., Gravity-wave motions in the mesosphere, *J. Atmos. Terr. Phys.*, 46, 119-128, 1984.
- Vincent, R. A., Results from the SPARC radiosonde initiative, S08.1-5 10, Abstracts IAMAS 2001, 2001.
- Vincent, R. A., and Eckermann, S. D., VHF radar observations of mesoscale motions in the troposphere: Evidence of gravity wave Doppler shifting, *Radio Sci.*, 25, 1019-1037, 1990.
- Vincent, R. A., and Fritts, D. C., A climatology of gravity wave motions in the mesopause region at Adelaide, Australia, *J. Atmos. Sci.*, 44, 748-760, 1987.

- Vincent, R. A., and Alexander, M. J., Gravity waves in the tropical lower stratosphere : an observational study of seasonal and interannual variability J. Geophys. Res., 14, 17971-17982, 2000.
- Vincent, R. A., Allen, S. J., and Eckermann, S. D., Gravity-wave parameters in the lower stratosphere, Gravity wave processes: their parameterization in global models, K. Hamilton (Ed.), Springer Verlag, 7-25, 1996.
- Wallace, J. M., and Hobbs, P. V., Atmospheric Science – An introductory survey, Academic Press, 467 pp, 1977.
- Warner, C. D., and McIntyre, M. E., On the propagation and dissipation of gravity wave spectra through a realistic atmosphere, J. Atmos. Sci., 53, 3213-3235, 1996.
- Weinstock, J., Saturated and unsaturated spectra of gravity waves and scale-dependent diffusion, J. Atmos. Sci., 47, 2211-2225, 1990.
- Whiteway, J. A., Duck, T. J., Donovan, D. P., Bird, J. C., Pal, S. R., and Carswell, A. I., Measurements of gravity wave activity within and around stratospheric vortex, Geophys. Res. Lett., 24, 1387-1390, 1997.
- Whiteway, J. A., and Duck, T. J., Enhanced Arctic stratospheric gravity wave activity above a tropospheric jet, J. Geophys., 16, 2453-2456, 1999.
- Zink, F., and Vincent R. A., Wavelet analysis of stratospheric gravity wave packets over Macquarie Island: pt. 1, Wave parameters, pt. 2, Intermittency and mean-flow accelerations, J. Geophys. Res., 10, 10275-10297, 2001.