Peter Haynes Lectures: papers mentioned in lectures (and others that might be useful)

Some of the references below are textbooks, review articles, encyclopedia articles, etc which set out some of the basic material for different topics. Others are simply papers from which I have taken Figures to show in my lectures – but they are good sources of information and lead via reference lists or citation lists to other sources.

LECTURE 1

Kelvin-Helmholtz instability – there is an excellent introductory review paper by Smyth and Moum (2012).

Reduction of equations to incompressible form with stratification or to 'primitive equation' form making hydrostatic approximation – see textbooks such as Gill (1982) 'Atmosphere-Ocean Dynamics' or Vallis (2017) 'Atmospheric and Oceanic Fluid Dynamics: Fundamentals and Large-Scale Circulation, 2nd Edition'.

Internal gravity waves, inertia-gravity waves (which is the term often used to mean internal gravity waves with rotation) – see Gill (1982) Chapter 8, Vallis (2017) Chapter 7. Sutherland (2010) 'Internal gravity waves' is a good book entirely dedicated to the topic (without rotation).

Pictures shown were taken from Boehm and Verlinde (2000), Dauhut et al (2015), Kiladis et al (2009).

LECTURE 2

Shallow-water equations (Saint Venant equations) – see Gill (1982), Chapter 5, or Vallis (2017), Chapter 3.

Rossby adjustment problem – Vallis (2017), Chapter 3, Gill (1982), Chapter 7.

Kelvin waves – Vallis (2017), Chapter 3, Gill (1982), Chapter 10. I mentioned a recent paper by Delplace et al (2017) identifying equatorial Kelvin waves as 'topological waves'.

Potential vorticity conservation and implications including quasi-geostrophic equations for slow flow – Vallis (2017), Chapters 4 and 5, Gill (1982), Chapters 7 and 12.

LECTURE 3

2-dimensional and geostrophic turbulence – Vallis (2017), Chapters 11 and 12, Boffetta and Ecke (2012), Vallgren and Lindborg (2010), Lapeyre (2017), Held et al (1995).

Geophysical vortices – Carton et al (2010), Khaykin et al (2020).

Gravity-wave generation by slow/balanced flow: Snyder et al (1993), Vanneste and Yavneh (2004), Vanneste (2013) (recommended review article), Danioux et al (2012).

Oceanic Rossby waves – Chelton and Schlax (1996).

Wave activity and wave, mean flow interaction: Vallis (2017), Chapter 10.

Quasi-biennial oscillation: time series of winds -- https://www.geo.fu-berlin.de/en/met/ag/strat/produkte/qbo/index.html, simple dynamical model – Plumb (1977).

LECTURE 4

Rossby wave critical layers – Haynes (2015), Vallis (2017) Chapter 16, McIntyre and Norton (1990).

Stochastically forced flow on a β-plane – Srinivasan and Young (2012) is a good introduction. The book 'Zonal Jets' (Galperin and Read, 2019) is very comprehensive. I showed pictures from the following papers, or otherwise mentioned in my presentation: Danilov and Gurarie (2004), Rhines (1975), Williams (1975), Farrell and Iannou (2007), Cravatte et al (2017), Scott and Tissier (2012), Cope (PhD thesis) (2020), Constantinou et al. (2014).

I mentioned very quickly the paper of Pathak et al (2018) on machine learning applied to the solution of the Kuramoto-Sivashinsky equation.

Equatorial waves and moist dynamics – this is a bid and complicated subject. Kiladis et al (2009) is a good review on 'convectively coupled waves', discussing how the dry dynamical theory of equatorial waves needs to be extended to explain observations by including moisture effects. Muller and Held (2012) and Craig and Mack (2013) both the discuss the separate topic of convective aggregation. Jiang et al (2020) and Zhang et al (2020) are two recent review articles on the Madden-Julian Oscillation (MJO), which may combine aspects of equatorial waves and aspects of convective aggregation. Both articles note that there is satisfactory theory of the MJO and review, or at least comment on, some of the candidate theories.

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