Mountain Wave Generation and Breaking

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Outline:

1. Introduction to mountain waves
    a. Equations
    b. Steady state
    c. Scorer Parameter and intrinsic frequency
    d. Phase speed and group velocity
    e. Momentum and energy flux
    f. Vertically propagating and trapped waves
    g. Famous Queney solution

2. Observational techniques (aircraft and satellite methods)

3. Numerical techniques (FFT methods and Doyle intercomparison paper)

4. Control of mountain wave breaking
    a. Non-dimensional mountain height
    b. Effect of mountain planform shape on splitting and breaking
    c. Effect of wind and stability profile

5. Wave breaking and severe downslope winds
    a. Critical level non-linear resonance
    b. Self-induced critical level
    c. Long's Model solution
    d. Observations of severe downslope winds

6. Wave breaking and PV generation
    a. PV Banners
    b. Lee eddies
    c. Bernoulli, jets and wakes

7. Wave breaking in the stratosphere
    a. Air density and the bullwhip effect
    b. Momentum deposition and secondary circulations
    c. Discovery of downgoing waves
    d. Models of secondary wave generation
    e. Future measurement campaigns