Gravity waves are parameterized in climate models to control waves and to improve the realism of winds.

A. Polar winds, temperatures, and ozone chemistry

These processes are known to be important for seasonal, interannual, and regional climate simulations. For the initialization of development effects on climate, parameterization of the propagation and dissipation of gravity waves is essential.

**New Constraints on Parameterized Gravity Waves for Climate Model Applications: An International Collaborative Project**

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**INTRODUCTION**

Gravity waves are parameterized in climate models to control waves and to improve the realism of winds.

**TABLE 2: Climate models to be used in the comparisons**

<table>
<thead>
<tr>
<th>Climate model</th>
<th>Author(s)</th>
<th>Resolution</th>
<th>University/Institution</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECHAM-5/MPI</td>
<td>Schättler et al. [2005]</td>
<td>T159</td>
<td>Max Planck Meteorology</td>
</tr>
<tr>
<td>ECHAM-5/MPI</td>
<td>Ceppi et al. [2005]</td>
<td>T159</td>
<td>Max Planck Meteorology</td>
</tr>
<tr>
<td>ECHAM-5/MPI</td>
<td>Liu et al. [2005]</td>
<td>T159</td>
<td>Max Planck Meteorology</td>
</tr>
<tr>
<td>ECHAM-5/MPI</td>
<td>Zhao et al. [2005]</td>
<td>T159</td>
<td>Max Planck Meteorology</td>
</tr>
</tbody>
</table>

**BACKGROUND:**

Parameterizations of gravity waves in climate models are designed to represent the propagation, dissipation, and source terms of gravity waves. The parameterizations are based on theoretical predictions and empirical observations.

**TABLE 3: Table of the gravity wave parameterizations used in the intercomparison**

<table>
<thead>
<tr>
<th>Parameterization</th>
<th>Description</th>
<th>Author(s)</th>
<th>Resolution</th>
<th>University/Institution</th>
</tr>
</thead>
<tbody>
<tr>
<td>TKE parameterization</td>
<td>Turbulent kinetic energy parameterization</td>
<td>Bacmeister et al. [2000]</td>
<td>T213/L256</td>
<td>University of Colorado</td>
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</tr>
</tbody>
</table>

**NEW DEVELOPMENTS:**

Recent developments in gravity wave parameterization include the following:

- Improved parameterizations for nonorographic gravity waves
- Enhanced parameterizations for orographic gravity waves
- New parameterizations for wave-induced stratospheric warming

**REFERENCES:**


**FIGURE 1:** Absolute momentum flux for the July 2006 ECHAM simulation at 70 km (v = -20). Nonorographic (left) and orographic (right) fluxes in nms.