TROPICAL TROPOSPHERIC WAVES OVER KALAHARI TRANSECT OF AFRICA AND POSSIBLE IMPACTS ON CLIMATE CHANGE

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The Kalahari Transect spans the gradient between the arid subtropics and the moist tropics in southern Africa, a zone potentially susceptible to changes in the global precipitation patterns. It lies within the territories of eight countries, from north to south: Gabon, Republic of Congo, Angola, Zambia, Zimbabwe, Namibia, Botswana and South Africa.
Zone is susceptible to changes in the global precipitation patterns

Precipitation patterns largely due to mesoscale convective activities driven by tropospheric wave patterns

Three types of waves play important roles:
- Pure gravity waves
- Inertia gravity waves
- Easterly waves

Inertia gravity waves are most dominant in area of study
\[ \sigma_0^2 \left\{ \left[ 2 \lambda_1 \left( \frac{1+R_1}{1-R_1} \right) + 1 + D_1 \right] - \left[ 2 \lambda_2 \left( \frac{1+R_2}{1-R_2} \right) + 1 + D_2 \right] \right\} \\
+ \sigma_0 \left\{ 2 \alpha u_1 \left[ 2 \lambda_1 \left( \frac{1+R_1}{1-R_1} \right) + 1 + D_1 \right] - 2 \alpha u_2 \left[ 2 \lambda_2 \left( \frac{1+R_2}{1-R_2} \right) + 1 + D_2 \right] \right\} \\
+ \left\{ \alpha^2 u_1^2 \left[ 2 \lambda_1 \left( \frac{1+R_1}{1-R_1} \right) + 1 + D_1 \right] - \alpha^2 u_2^2 \left[ 2 \lambda_2 \left( \frac{1+R_2}{1-R_2} \right) + 1 + D_2 \right] \right\} = 0 \ (10) \]
ZONES OF STRONG INERTIA GRAVITY WAVES IN KALAHARI TRANSECT
FACTORS THAT INFLUENCE STRONG INERTIA GRAVITY WAVES IN KALAHARI TRANSECT

- Flows over the horse-shoe mountain ranges around the transect
- Temperature gradient between the (warm) southern Indian and (cold) southern Atlantic oceans
- Influence of tropical east Pacific ocean still unexplored
- Frequency (just like in tropical North Africa) may affect the rainfall regime in the transect
- Inter-annual and decadal variabilities under investigation
Thank you