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Wavelet analysis of nonlinear, dispersive internal gravity waves

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Model studies of internal gravity waves have been undertaken for a variety of regions. Wavelet analysis is applied to the results and dispersion is computed using the approach described by Meyers (1993). In some cases, data is available and wavelet analysis is used to compute dispersion. Qualitative agreement between model and data dispersion results is achieved in some cases.

An igw sequence is decomposed into its wavelet components by means of the wavelet transform. The transform is successively applied to the igw sequence using a scaled analyzing wavelet which is then 'slid' along igw sequence through the implementation of the transform. Scaling by contraction or dilation of the analyzing wavelet creates an adjustable window used to probe the igw sequence in much the same way as the eye can follow the score of a musical composition. Here we use the Morlet wavelet whose scale has a known asscociated Fourier wavelength. The wavelet transform, by definition, accomplishes the translation or sliding of the wavelet along the sequence by convolution of the wavelet with the igw sequence. The analysis yields the local wavelet power spectrum (Torrence and Compo, 1998).