

三层模式中风场对背风波的影响

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Effects of wind field on lee wave in three-layer model

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摘要 为了研究风场对背风波的影响, 针对边界层附近为弱稳定层结的背风波, 建立了一个三维三层的理论模型和线性计算模式, 分析了各层中风速和风向的变化对背风波特征的影响, 揭示了气流过孤立山脉产生背风波的有利风场条件。结果表明: 背风波的波长、振幅等特征对各层风速和风向的变化具有相当的敏感性, 波长随着低、高层风速的增大而增大, 随着中层风速的增大先减小后增大; 振幅随着低、中层风速的增大先增大后减小, 随着高层风速的增大而增大。此外, 风速和上下层风向切变的增大均使背风波的形态逐渐由横波型转为辐散型, 但是上下层风向的切变对背风波形态的影响比风速更为显著。

关键词: [背风波](#) [风场](#) [三层模式](#) [理论模型](#) [线性计算模式](#)

Abstract: Considering lee waves of slightly stable stratification in the boundary layer, a three-dimensional three-layer theoretic model and a linear numerical calculation mode were established in order to investigate the influence of wind on trapped lee waves. The effects of wind speed and wind direction on lee waves were discussed in each layer by model. The advantageous conditions forming lee wave were summarized when airflow passed over an isolated mountain. The results indicate that wavelength and amplitude of lee wave are sensitive to wind speed and wind direction in various layers. The wavelength of lee wave will increase with the increase of wind speed in low and high layers, while they will decrease firstly, and then increase with the increase of wind speed in middle layer. The amplitude of lee wave will increase firstly, and then decrease with the increase of wind speed in middle and low layers, while it increases in high layer. Also, lee wave shapes translate from trapped mode to divergence mode because the increases of wind speed and vertical wind shear. The effects of vertical wind shear on lee wave shape are more obvious than that of wind speed.

Keywords:

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