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On gravity wave parameterisation in vicinity of low-level blocking...

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The current orographic gravity wave drag parameterisation in the vicinity of low-level blocking is inadequate. Reducing the gravity wave amplitude (and thereby reducing the gravity wave drag) by assuming an effective mountain height dependent on the blocking depth is not realistic, yet this is implemented in most orographic gravity wave drag parameterisation schemes. The blocking layer acts as a sloped dynamic barrier that uplifts the air similarly to the mountain slope. Through a variety of mechanisms low-level blocking can induce more gravity waves or gravity waves with a higher momentum flux (compared to the current representation by parameterisation schemes). One possible solution is to modify the parameterisation scheme to not reduce the gravity wave momentum flux by the blocking depth. More realistic parameterisation schemes are likely to improve the models' performance.