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JUSTIFICATION OF THE HYDROSTATIC APPROXIMATION OF THE PRIMITIVE EQUATIONS IN ANISOTROPIC SPACE $L^\infty_H L^q_{x_3}(\mathbb{T}^3)$

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Abstract. The primitive equations are fundamental models in geophysical fluid dynamics and derived from the scaled Navier-Stokes equations. In the primitive equations, the evolution equation to the vertical velocity is replaced by the so-called hydrostatic approximation. In this paper, we give a justification of the hydrostatic approximation by the scaled Navier-Stokes equations in anisotropic spaces $L^\infty_H L^q_{x_3}(\mathbb{T}^3)$ for $q \geq 1$.

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