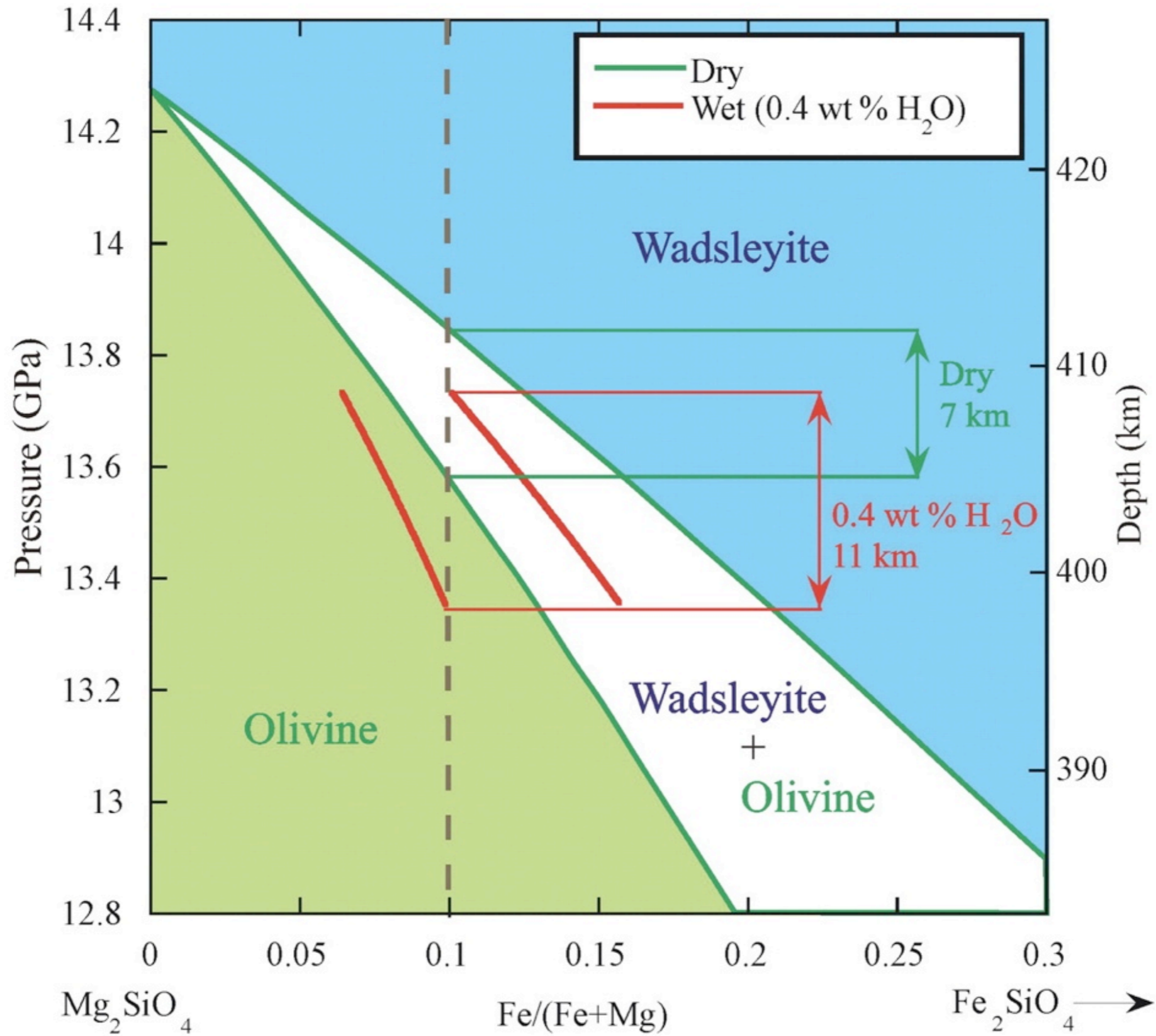


The Upper Mantle and Transition Zone



**FIGURE 4** The olivine-wadsleyite transformation in the  $\text{Mg}_2\text{SiO}_4$ - $\text{Fe}_2\text{SiO}_4$  system calculated at  $1400^\circ\text{C}$  under dry conditions and with 0.4 wt%  $\text{H}_2\text{O}$  (Frost and Dolejs 2007), which is the  $\text{H}_2\text{O}$  content required to saturate olivine at these conditions. The downward displacement of the two-phase region in the hydrous system is shown by the red curves. The vertical dashed line shows a typical mantle  $\text{Fe}/(\text{Fe}+\text{Mg})$  ratio of 0.1. The dry transition is approximately 7 km wide, while the addition of  $\text{H}_2\text{O}$  broadens the transition at these conditions to a maximum of 11 km.