

Monday, October 5, 2020

Example: Northern Ice cap water volume on Mars

$$\text{Estimated volume} = 10^6 \text{ km}^3 = V_{\text{H}_2\text{O}}$$

Q: If it melted, could it cover the planet?

$$\text{Radius of Mars: } R_{\text{Mars}} = 3395 \text{ km}$$

$$\begin{aligned} \text{Surface of Mars: } A_{\text{Mars}} &= 4\pi R_{\text{Mars}}^2 \\ &= 4(3.1415926)(3395)^2 \\ &= 144 \times 10^6 \text{ km}^2 \end{aligned}$$

$$\begin{aligned} \frac{V_{\text{H}_2\text{O}}}{A_{\text{Mars}}} &= \text{Depth}_{\text{H}_2\text{O}} = \frac{10^6 \text{ km}^3}{144 \times 10^6 \text{ km}^2} = \frac{1}{144} \text{ km} \\ &= 0.00694 \text{ km} \\ &= 6.94 \text{ m} \\ &\approx \underline{7 \text{ m}} \end{aligned}$$

7 m deep "ocean"