APPENDIX

D

Useful Numerical Values

FUNDAMENTAL CONSTANTS	
Universal gas constant (R^*)	$8.3143\ \text{J K}^{-1}\ \text{mol}^{-1}$
Boltzmann's constant (k)	$1.38 \times 10^{-23}\ \text{J K}^{-1}$
Stefan–Boltzmann constant (σ)	$5.67 \times 10^{-8}\ \text{W m}^{-2}\ \text{K}^{-4}$
Planck's constant (h)	$6.63 \times 10^{-34}\ \text{J s}$
Speed of light (c^*)	$2.998 \times 10^{8}\ \text{m s}^{-1}$
Gravitational constant	$6.67 \times 10^{-11}\ \text{N m}^2\ \text{kg}^{-2}$
SUN	
Luminosity	$3.92 \times 10^{26}\ \text{W}$
Mass	$1.99 \times 10^{30}\ \text{kg}$
Radius	$6.96 \times 10^{8}\ \text{m}$
EARTH	
Average radius (a)	$6.37 \times 10^{6}\ \text{m}$
Equatorial radius	$6.378 \times 10^{6}\ \text{m}$
Polar radius	$6.357 \times 10^{6}\ \text{m}$
Standard gravity (g)	$9.80665\ \text{m s}^{-2}$
Mass of Earth	$5.983 \times 10^{24}\ \text{kg}$
Mass of ocean	$1.4 \times 10^{21}\ \text{kg}$
Mass of atmosphere	$5.3 \times 10^{18}\ \text{kg}$
Mean angular rotation rate (Ω)	$7.292 \times 10^{-5}\ \text{rad s}^{-1}$
Total solar irradiance (S_o)	$1360.8 \pm 0.5\ \text{W m}^{-2}$
Mean distance from Sun (d)	$1.496 \times 10^{11}\ \text{m}$

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DRY AIR	
Average molecular weight (m_a)	28.97 g mol^{-1}
Gas constant (R) – R^*/m_a	287 J K^{-1} kg^{-1}
Density at 0°C and 101325 Pa	1.293 kg m^{-3}
Specific heat at constant pressure (c_p)	1004 J K^{-1} kg^{-1}
Specific heat at constant volume (c_v)	717 J K^{-1} kg^{-1}
WATER	
Molecular weight (m_w)	18.016 g mol^{-1}
Gas constant for vapor ($R_v = R^*/m_w$)	461 J K^{-1} kg^{-1}
Density of pure water at 0°C	1000 kg m^{-3}
Density of ice at 0°C	917 kg m^{-3}
Specific heat of vapor at constant pressure	1952 J K^{-1} kg^{-1}
Specific heat of vapor at constant volume	1463 J K^{-1} kg^{-1}
Specific heat of liquid water at 0°C	4218 J K^{-1} kg^{-1}
Specific heat of ice at 0°C	2106 J K^{-1} kg^{-1}
Latent heat of vaporization at 0°C	2.5×10^6 J kg^{-1}
Latent heat of vaporization at 100°C	2.25×10^6 J kg^{-1}
Latent heat of fusion at 0°C	3.34×10^5 J kg^{-1}