Seasonal variation of muons

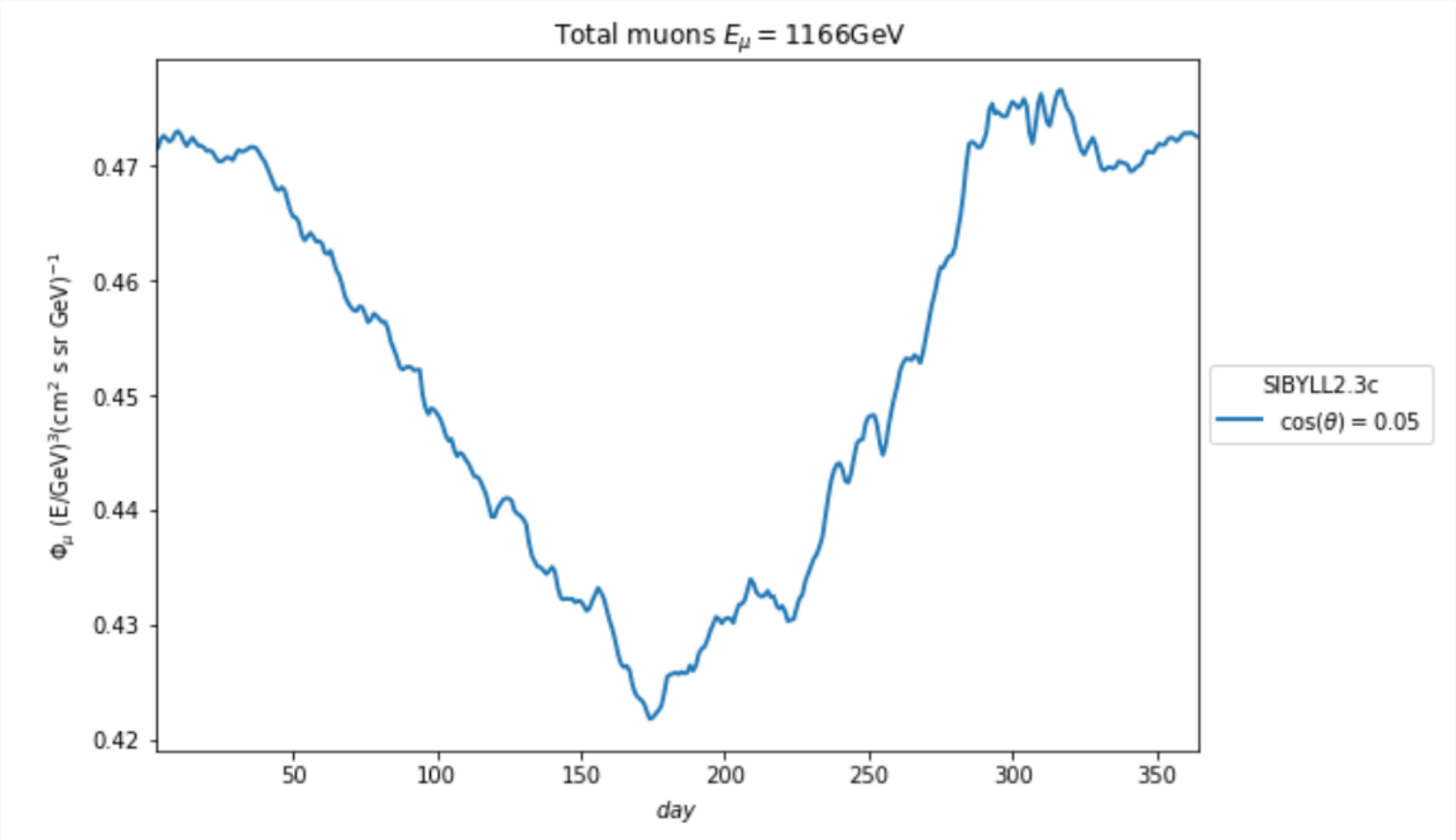

Figure 1: Muon flux at $E_\mu = 1166$GeV and $\cos\theta = 0.05$ from MCEq

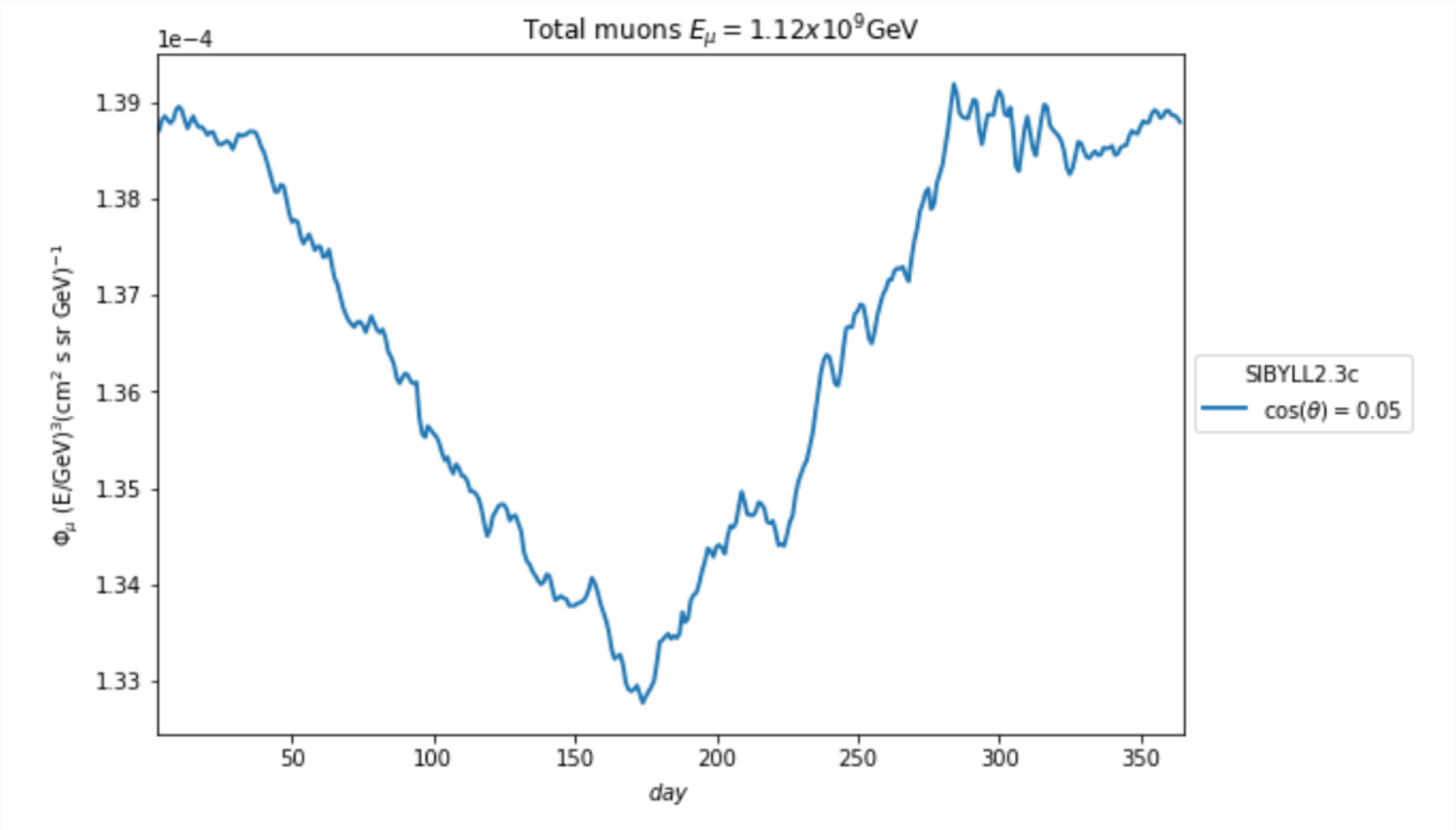

Figure 2: Muon flux at $E_\mu = 1.12X10^9$GeV and $\cos(\theta) = 0.05$ from MCEq

Atmospheric muon rate

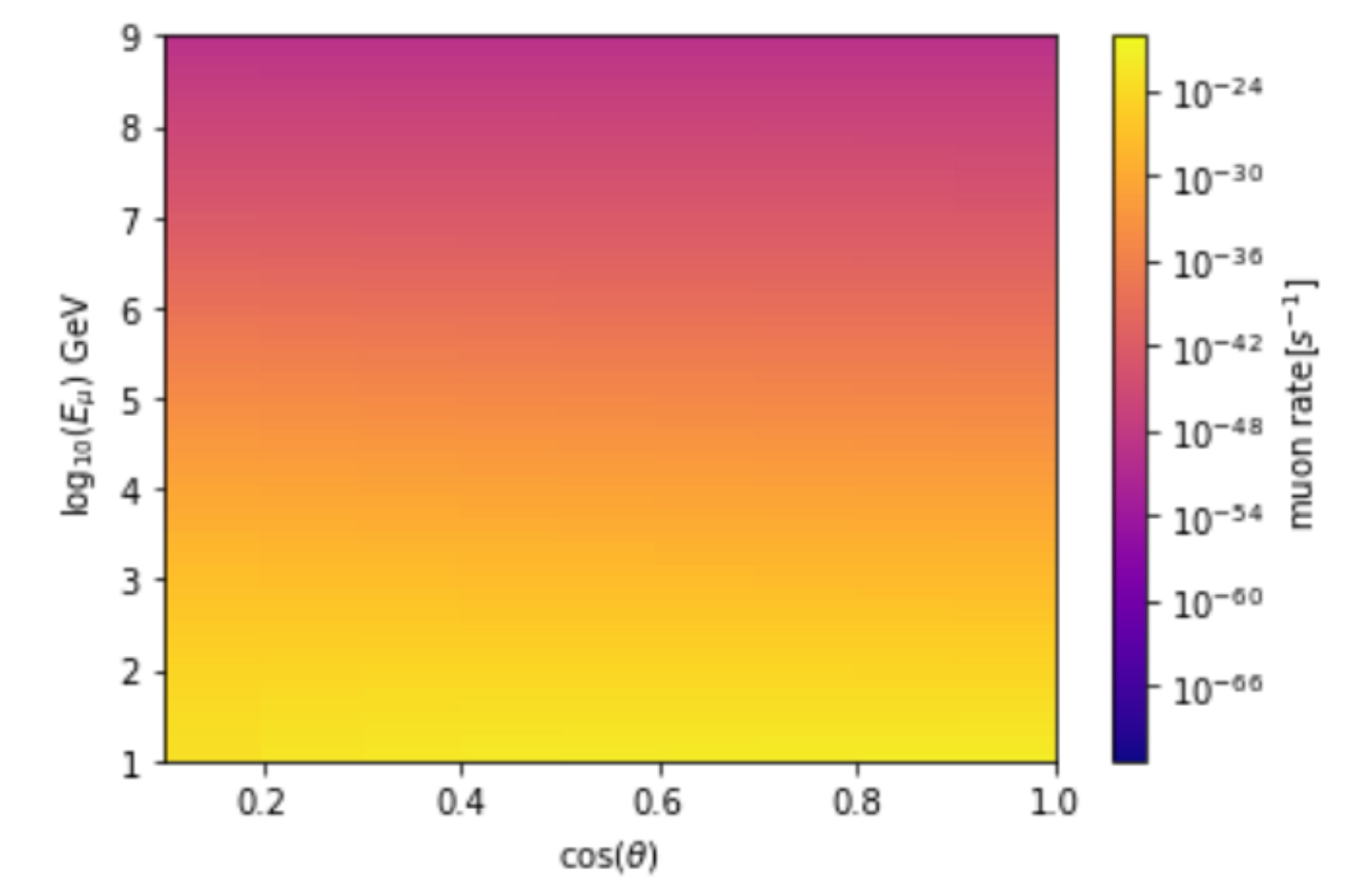

Figure 3: Atmospheric muon rate for the first day of the year 2013.

Weighting

Experimental data from an instrument like IceCube are ultimately just a set of counts. These are typically expressed as rates, which are independent of the observation time:

$$R \equiv \frac{N}{\Delta t} \tag{1}$$

Additionally, we have:

$$\frac{d\Phi}{dE} \equiv \frac{dN}{dt dA d\Omega dE} \tag{2}$$

that is, a number of expected events per unit time, area, solid angle, and energy. The generation spectrum of the simulation is a differential fluence, that is, the total number of events generated per unit area, solid angle, and energy. The ratio of the two is a weight in units of s^{-1}:

$$w \equiv \frac{dN_{expected}/dAdtd\Omega dE}{dN_{generated}/dAd\Omega dE} \tag{3}$$

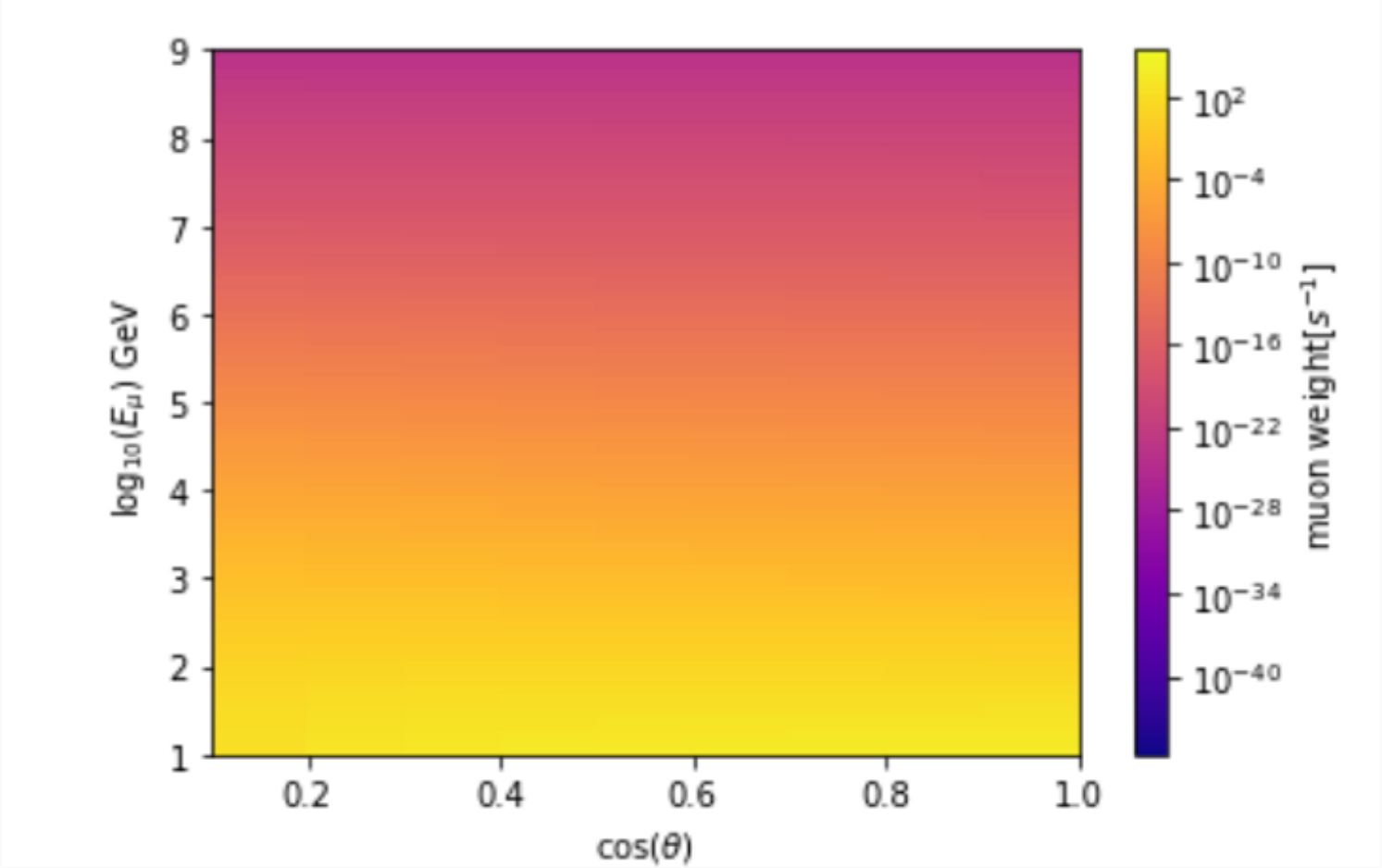

Figure 4: Atmospheric muon weight for the first day of the year 2013.