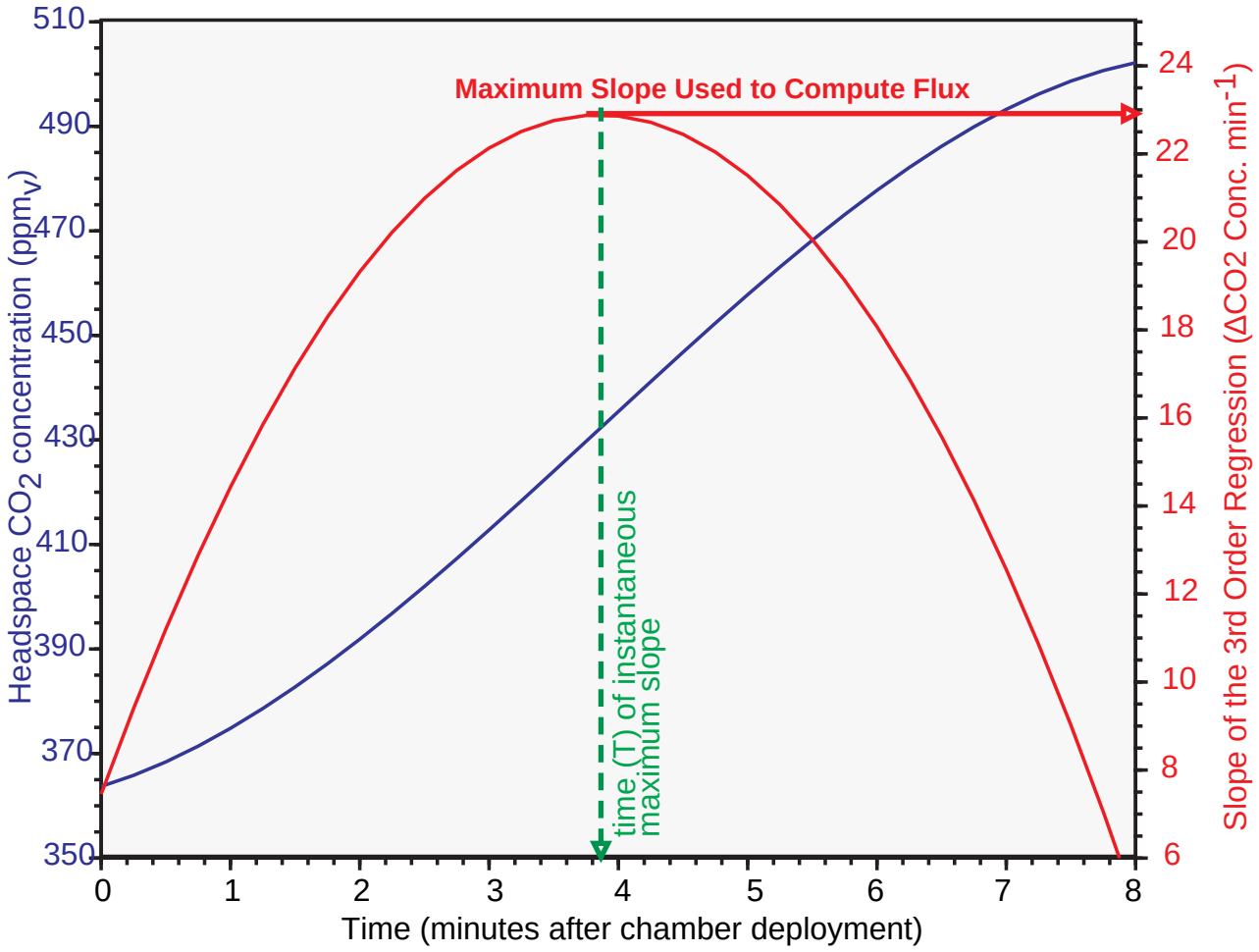

Summary of Method

1. Obtain the equation for the 3rd order regression from the headspace CO_2 concentration by time data series:

$$Y = w + xT + yT^2 + zT^3 \quad \text{[Eqn 1]}$$

2. Obtain the first derivate (slope) of **[Eqn 1]**:

$$dY/dT = x + 2yT + 3zT^2 \quad \text{[Eqn 2]}$$

3. Obtain the second derivate of **[Eqn 1]** (slope of **[Eqn 2]**):

$$d^2Y/dT^2 = 2y + 6zT \quad \text{[Eqn 3]}$$

4. Solve **[Eqn 3]** for $d^2Y/dT^2 = 0$ (the time (T) of instantaneous maximum slope of **[Eqn 1]**:

$$T = -2y/6z$$

5. Substitue **T** (**-2y/6z**) into **[Eqn 2]** and solve for the instantaneous maximum slope.

6. Using this slope and the chamber volume and soil surface area compute the instantaneous maximum CO_2 flux density (soil respiration).

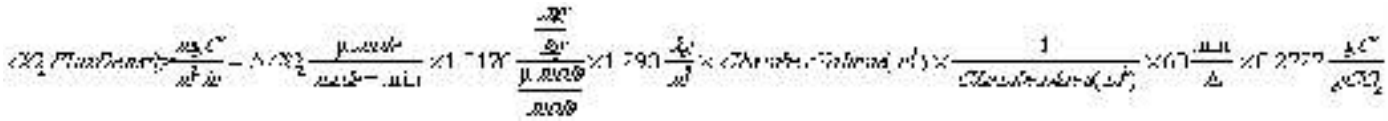

Figure 11. Headspace carbon dioxide concentration time series showing graphical solution to estimation of "true" flux density and summary equations.