45. Since the spreading is assumed uniform, the count rate $R = 74,000/\text{s}$ is given by $R = \lambda N = \lambda(M/m)(a/A)$, where $M = 400\,\text{g}$, m is the mass of the ^{90}Sr nucleus, $A = 2000\,\text{km}^2$, and a is the area in question. We solve for a:

$$\begin{aligned} a &= A\left(\frac{m}{M}\right)\left(\frac{R}{\lambda}\right) = \frac{AmRT_{1/2}}{M \ln 2} \\ &= \frac{(2000 \times 10^6\,\text{m}^2)(90\,\text{g/mol})(29\,\text{y})(3.15 \times 10^7\,\text{s/y})(74,000/\text{s})}{(400\,\text{g})(6.02 \times 10^{23}/\text{mol})(\ln 2)} \\ &= 7.3 \times 10^{-2}\,\text{m}^2 = 730\ \text{cm}^2\ . \end{aligned}$$