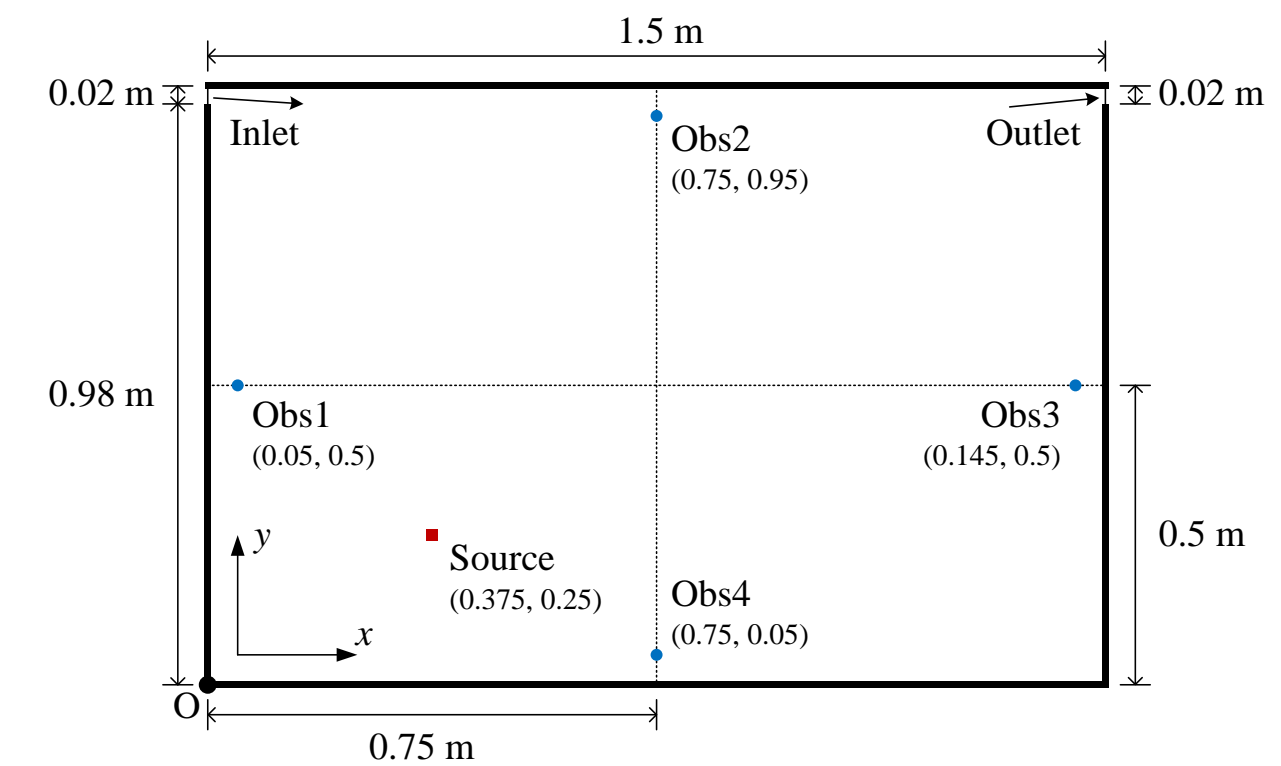
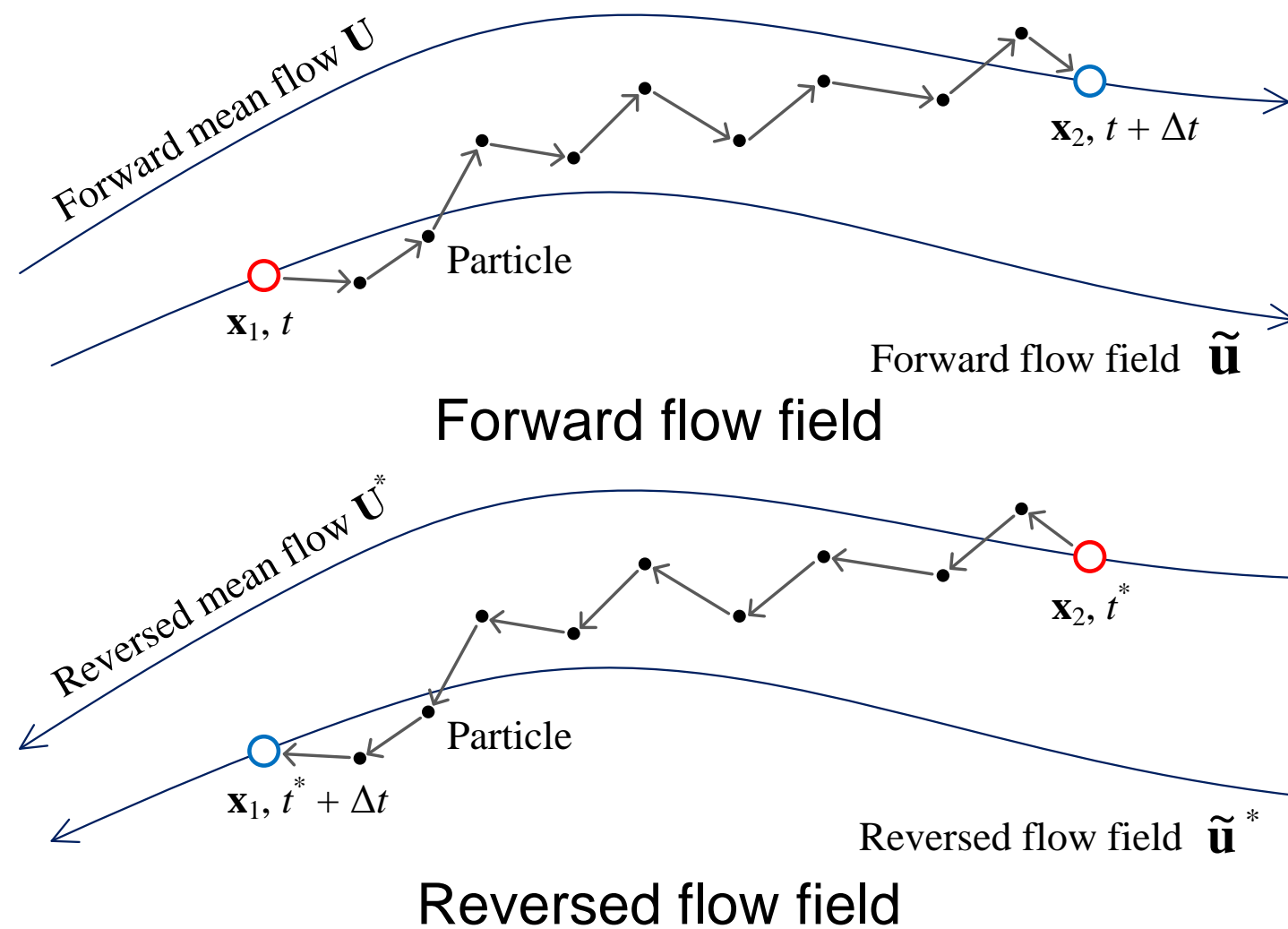


# Development of source identification method of environmental pollutants

- In a case that the concentration of environmental contaminants is detected in urban / building space, quick identification of the source (position and strength) of the substance makes it possible to effectively cope with concentration and damage reduction.
- We investigated tracer particle behavior in reverse flow field from a stochastic point of view and proposed a source identification method based on its diffusion properties.
- We applied the proposed method to the diffusion problem in two-dimensional indoor space and examined its effectiveness.



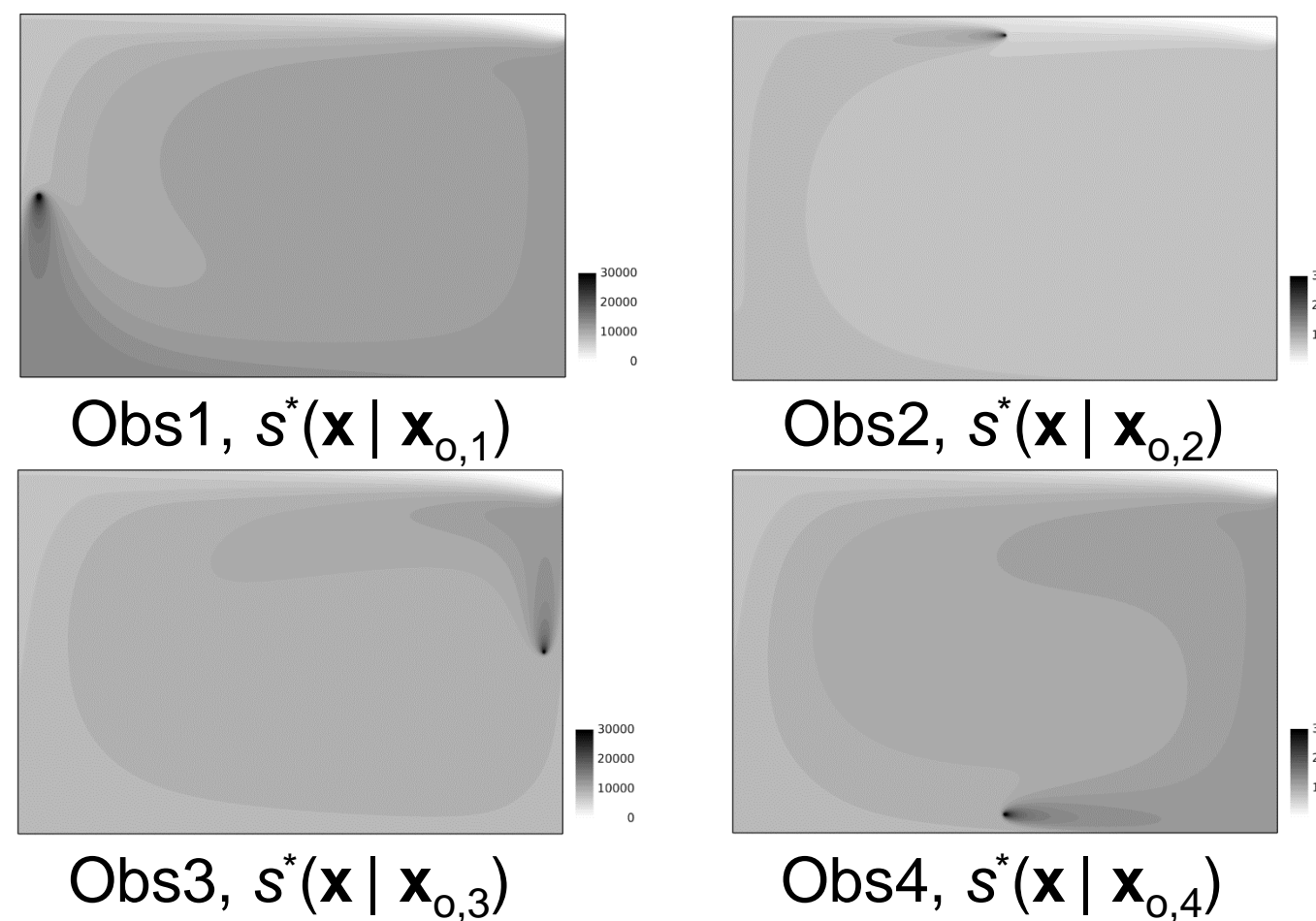
Test case setting



Conceptual paths of symmetric particle behavior in forward and reversed flow fields

$$s(\mathbf{x}_2 | \mathbf{x}_1) = s^*(\mathbf{x}_1 | \mathbf{x}_2)$$

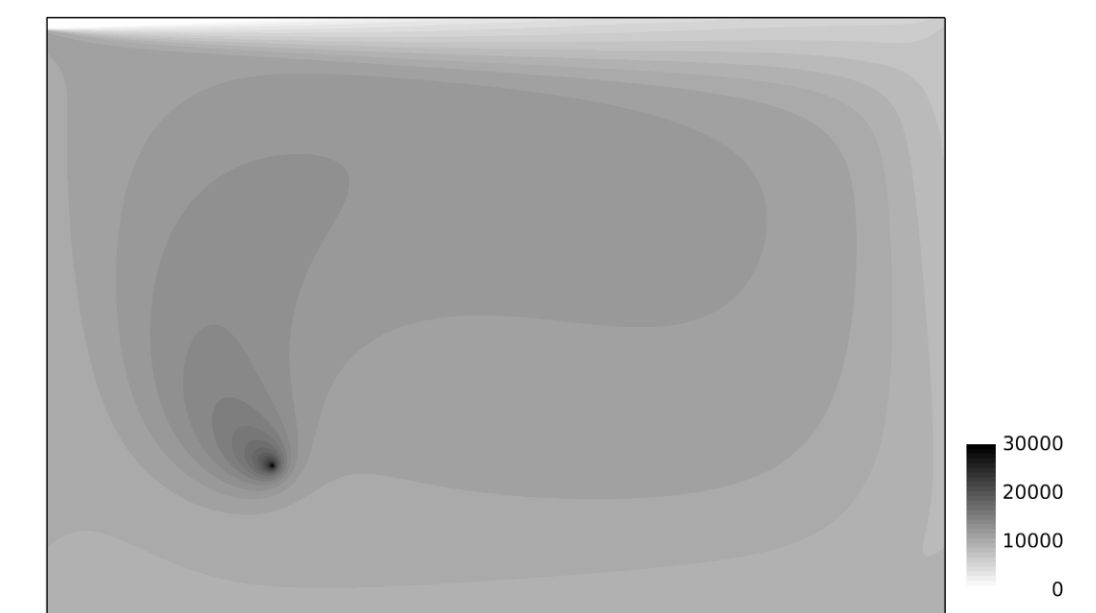
Symmetry of expected staying time of particles



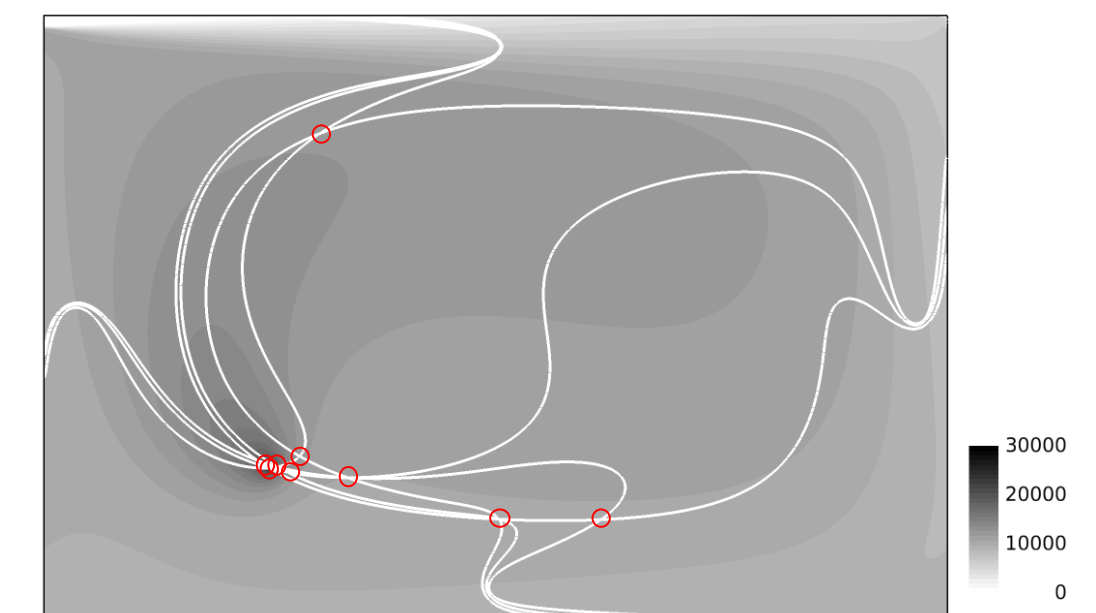
Distribution of expected staying time of tracer particles in the reversed flow field

$$s^*(\mathbf{x}_s | \mathbf{x}_{o,1}) = s^*(\mathbf{x}_s | \mathbf{x}_{o,2}) = \dots = s^*(\mathbf{x}_s | \mathbf{x}_{o,N})$$

Equation to identify the source location



Distribution of pollutant concentration



Estimated position of the source (o)