

## Equilibrium partitioning of organic compounds

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# Introduction

Typically, every closed system - the term "closed" means that neither energy nor mass is entering or leaving the system - will attain an equilibrium state with respect to (i) temperature (i.e., no temperature gradient in the system), (ii) the partitioning of chemicals, and (iii) to any kind of chemical reactions (i.e., equal forward to reverse rates such that there are no net reactions in the system). In this chapter we are only interested in the partitioning of chemicals between various (environmental) phases.

What is the relevance of partition equilibria in environmental chemistry?

Upon entering the environment, chemicals are immediately subject to partition processes. The most important natural phases for the partitioning of organic chemicals are the water phase (which includes rivers, lakes, oceans, raindrops, fog droplets, ... ), air, and organic phases (including living organic biota and dead organic material such as humic matter in soils). And although there are typically no closed systems in the environment, we do still encounter many situations where the chemical has been in the system for a sufficiently long time to establish a local partition equilibrium. Such local partition equilibria are typically established in the atmosphere between the gas phase and rain, fog, snow or aerosols but also in soil or sediment on smaller scales (centimeters).

In the following sections various examples of equilibrium partitioning are discussed.

