

# Aquatic risk assessment for non-standard chemicals with a physical mode of action (forming a film on the water surface) and mesocosm data - 2D and 3D

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## ● INTRODUCTION

Standard aquatic RA assumes solubility of substances in water, and compares predicted concentration in the field with effect concentrations. For substances not miscible with water, the spray mist of a drift event settles on the water surface, where it may form a film if the amount per area is high enough. This film can cut off the atmospheric air supply for aquatic insects, if it is thick enough and continuous.

In the case study presented here, these aquatic insects were assessed in mesocosm studies with realistic spray applications, mimicking spray drift. Predicted environmental exposure also focusses on spray drift – as agreed with regulatory authorities. Hence, both exposure levels and effect levels can be expressed as rates, and be compared directly, using a two-dimensional approach (2D), applying the usual assessment factor. The standard procedures in aquatic risk assessment are three-dimensional (3D), comparing exposure and effect concentrations, which is appropriate for most organisms. However, for the surface dwellers discussed here, concentrations are purely theoretical (virtual – nominal concentrations), because in reality the substances act as physical films at the surface (water meniscus).

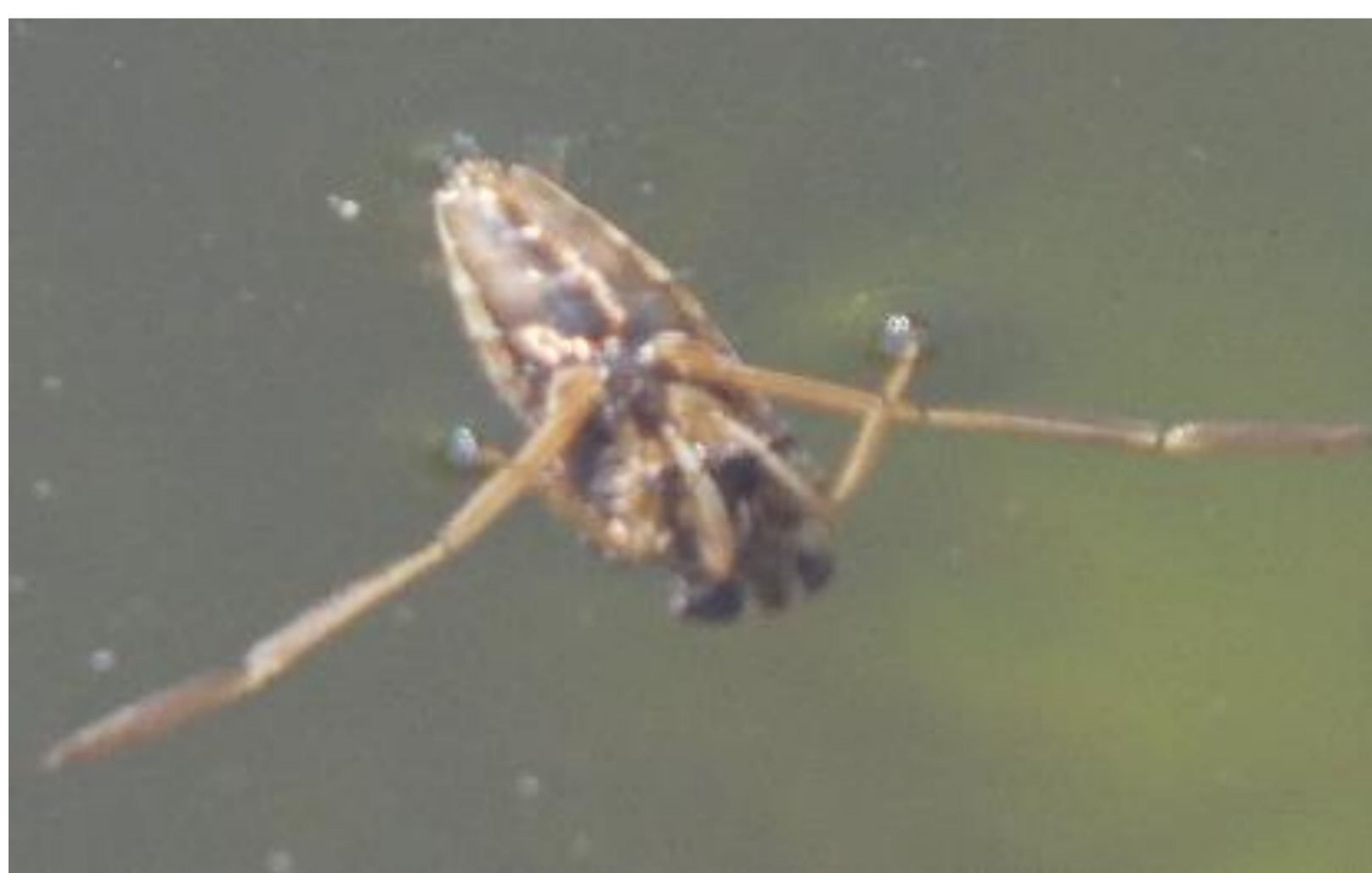
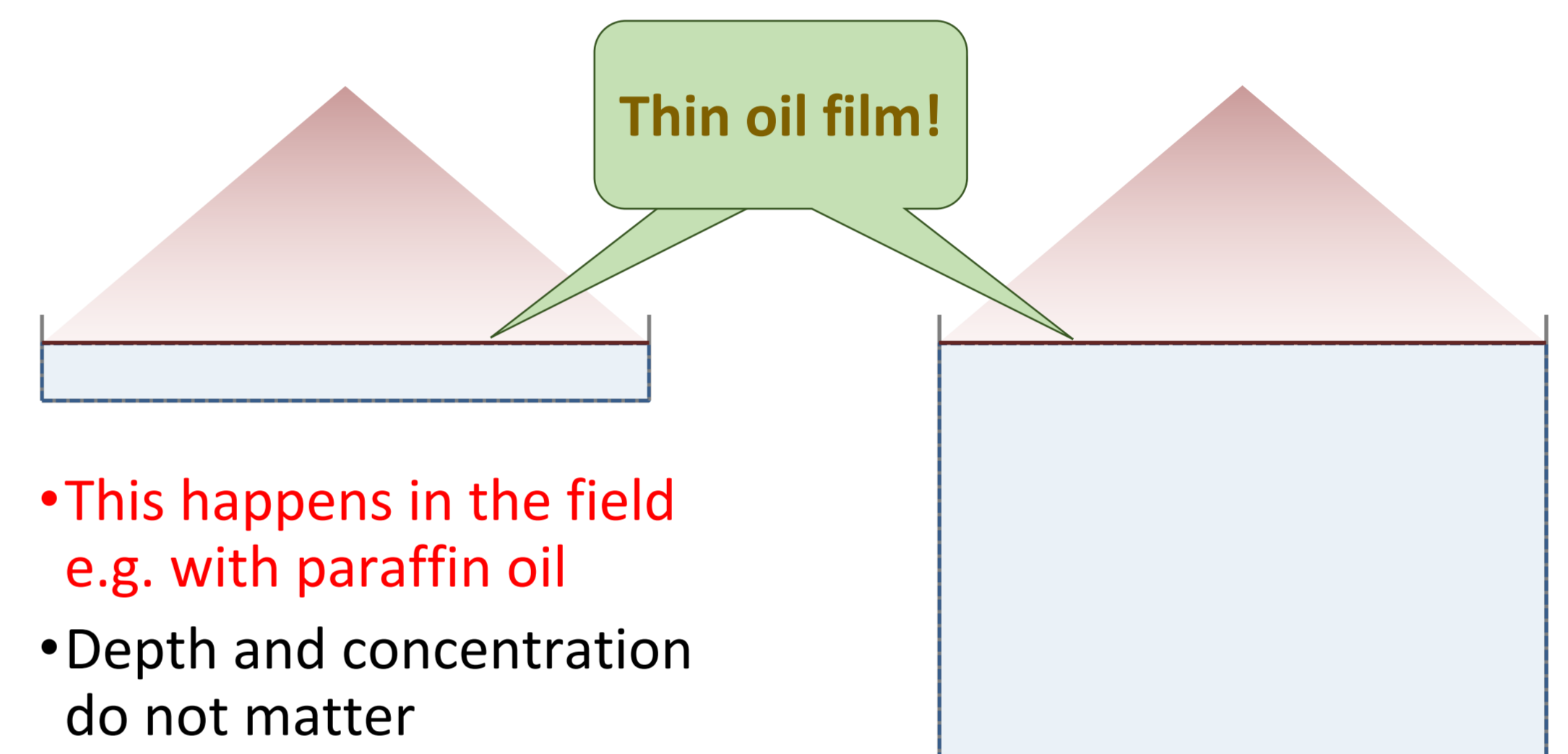


## ● Targets:

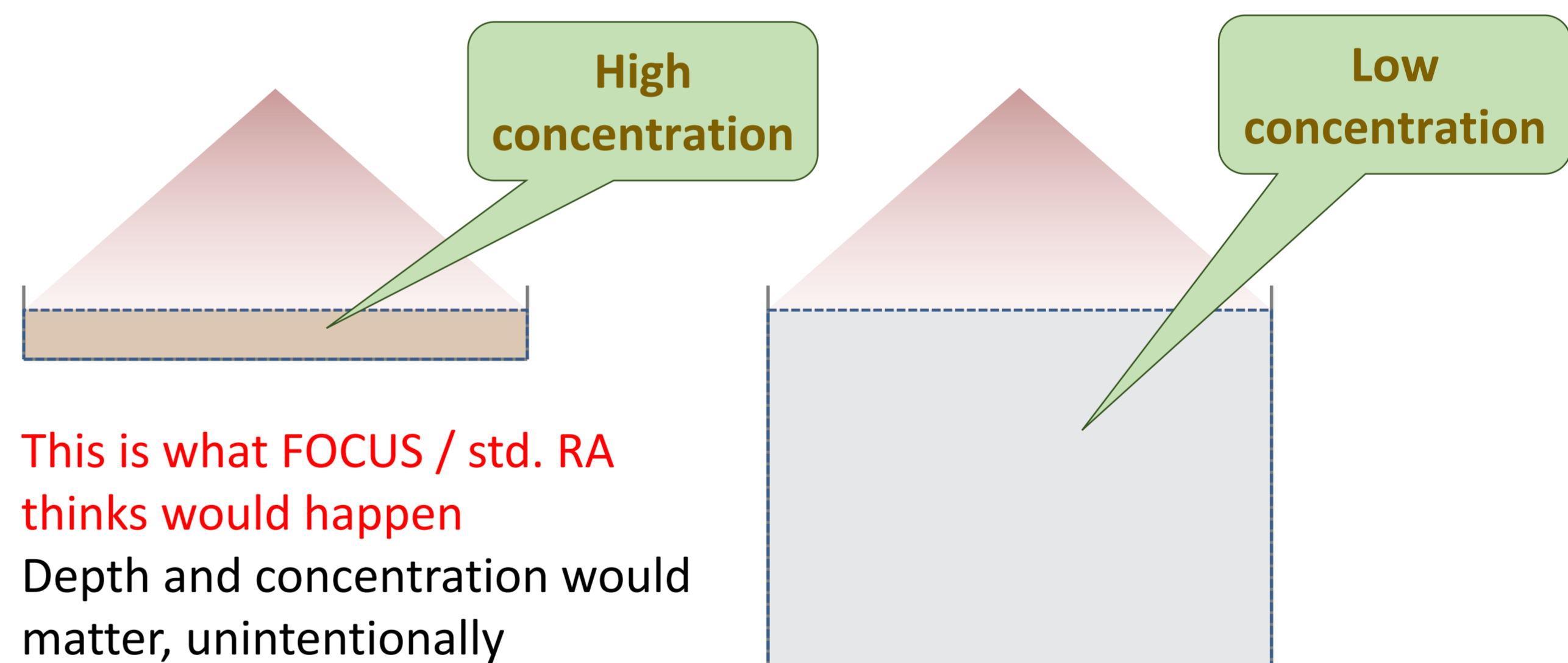
1. Properties of chemicals considered
2. Nature of effect data considered
3. Direct assessment (not using virtual concentrations; these may introduce an error in the RA )
4. Conservative yet realistic risk assessment

For oils not soluble in water, lighter than water, with matching mesocosm data:

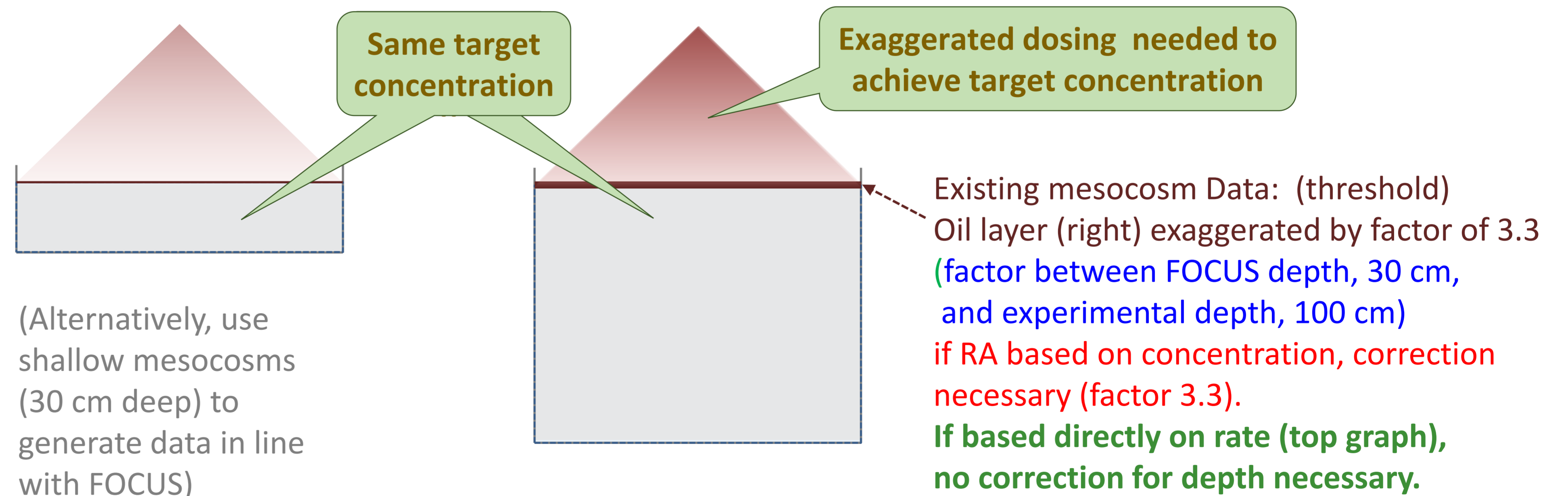
- Deposition per area [m<sup>2</sup>] matters, not concentration
- 100 mg/m<sup>2</sup>: continuous layer, threshold of effects



Normal surface film



Pronounced surface film (still a natural film, no application!)



## ● RESULTS & CONCLUSIONS

It is proposed to include an additional risk assessment option for this special type of oily active substances and organisms affected by a film, if effect data are primarily a rate (amount of oil per area water). In these cases, a two-dimensional risk assessment is the only appropriate approach, even if deviates from the standard procedures defined in EFSA's 2013 aquatic guidance document. This proposed rate-based risk assessment for aquatic organisms may be relevant for other substances under assessment, i.e. those with very high Log K<sub>OC</sub> that are not miscible with water and form films on the water surface, and where matching effect data are also available.



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