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Operational Dispersion Ensemble at MeteoSwiss

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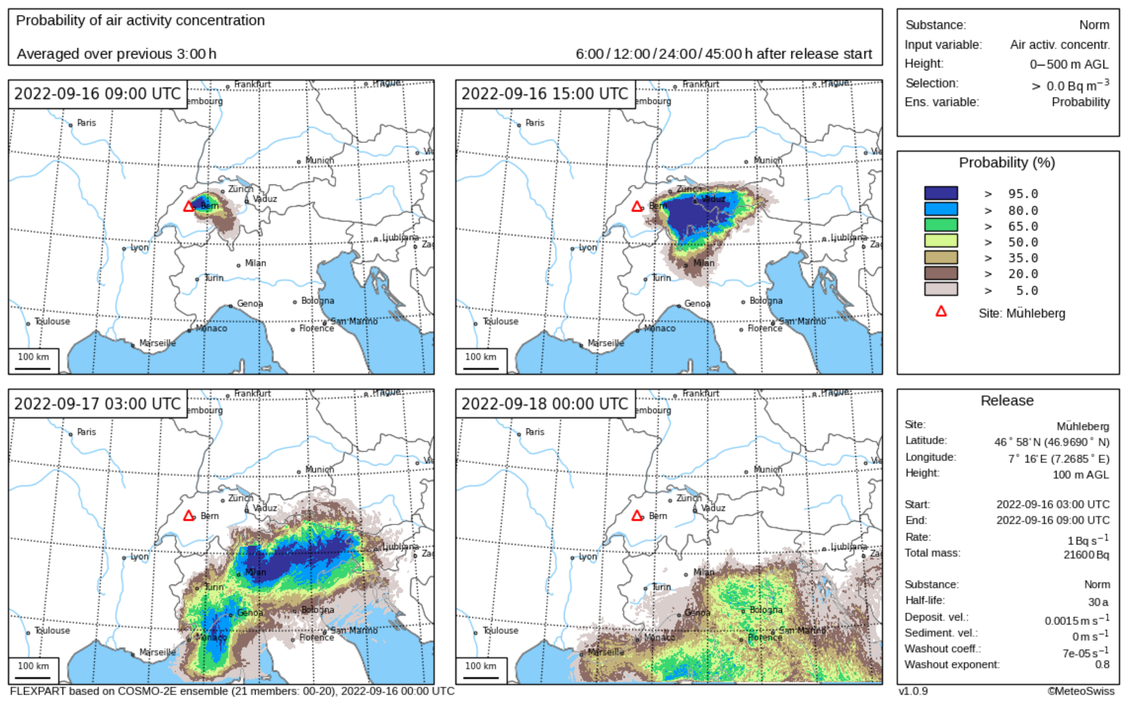
Introduction

In the first hours after an **accidental release** of airborne hazardous material, **emergency response** heavily relies on dispersion simulations, which are inherently **uncertain**.

To quantify this uncertainty, MeteoSwiss operates a **dispersion ensemble**, both in routine and on-demand modus.

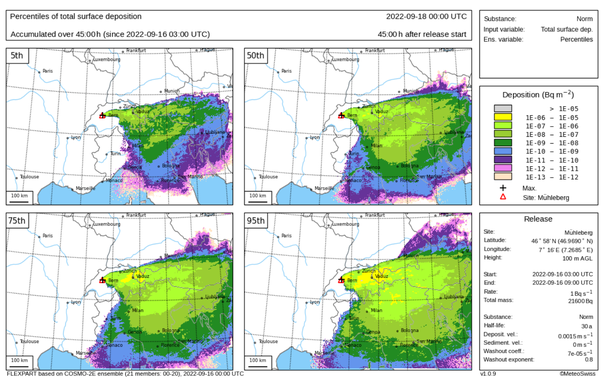
Here, we present a sample from the currently **operational** set of graphics.



Operational Setup at MeteoSwiss

Meteorology:
21-member ensemble forecast with COSMO model, grid with 2.2 km spacing, 120 h forecast calculated every 6 hours

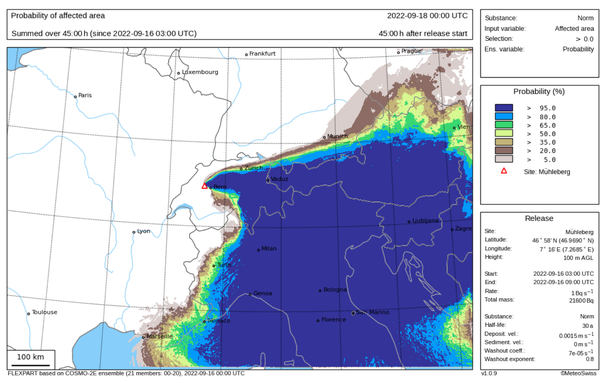
Dispersion:
FLEXPART particle dispersion model run on each member, 48 h forecast calculated every 6 hours with a predefined source term for 6 locations in and near Switzerland



Probabilities

Calculated from **ensemble distribution** at each grid cell.
Probabilities are calculated for the following properties:

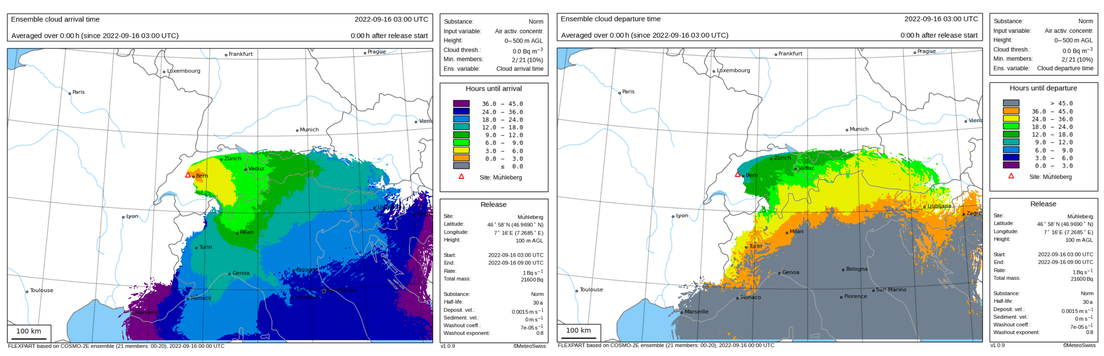
- Air **activity concentration** > 0 ↑
- Integrated air activity concentration > 0
- Deposition > 0
- Probability to be part of the **affected area** →
  (Conc. below 500 m AGL > 0 or depo. > 0)



Ensemble Statistics (I)

For integrated activity concentration and **deposition** ↖

- Percentiles: 5th, 50th (median), 75th, 95th
- 95th percentile additionally for affected area



Arrival time ↑
(in 2nd member)

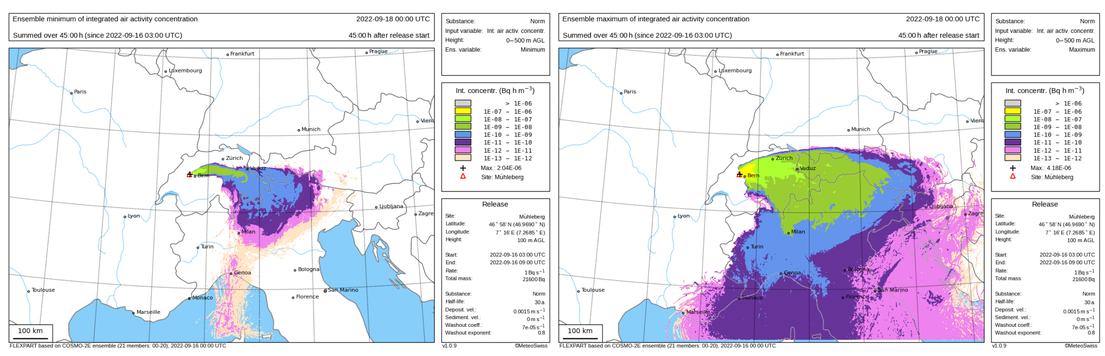
Cloud timing

Departure time ↑
(from 2nd-to-last member)

Ensemble Statistics (II)

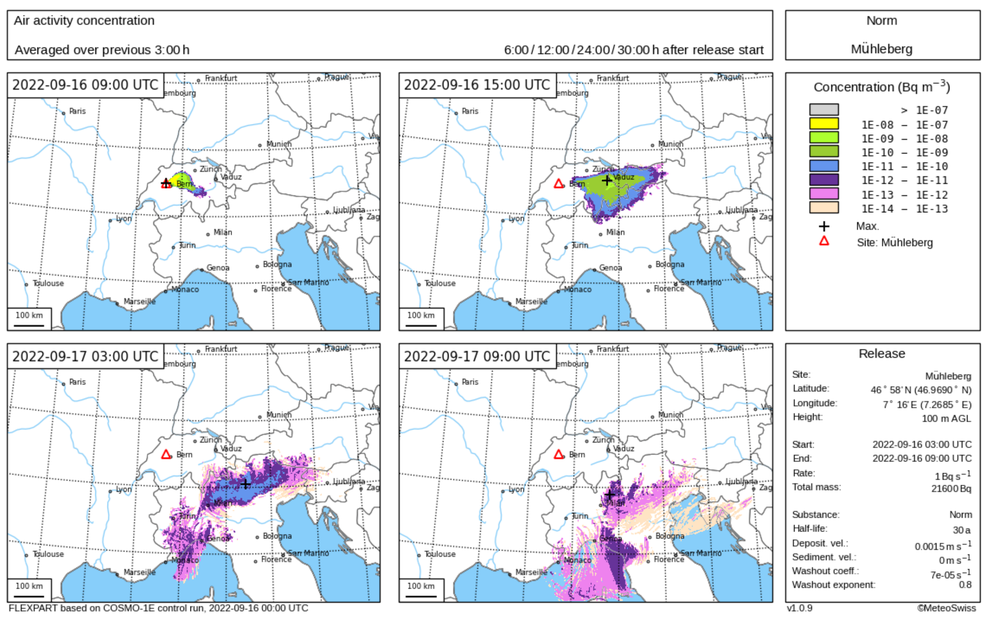
For **integrated activity concentration** and deposition

- **Minimum ↓**, mean, median, **maximum ↓** value



Deterministic Forecast

- Air activity **concentration ↓**



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