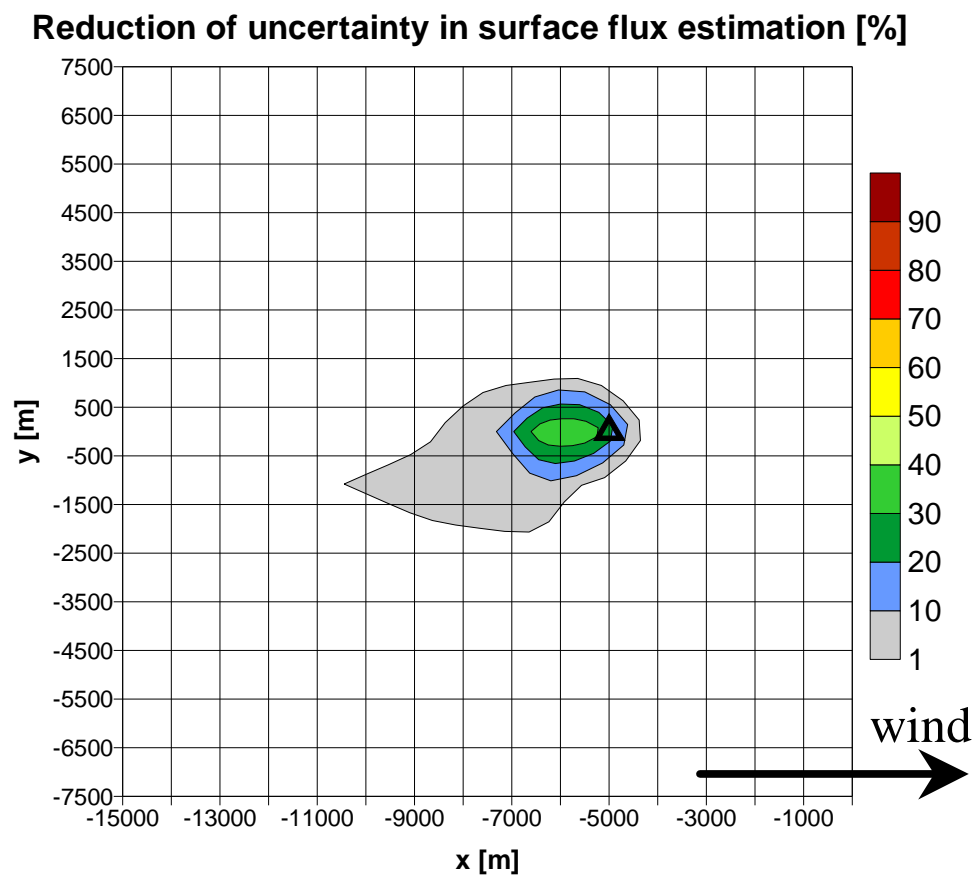


Testing Sampling Strategies
for Power Parachute Flights
at the WLEF tower location

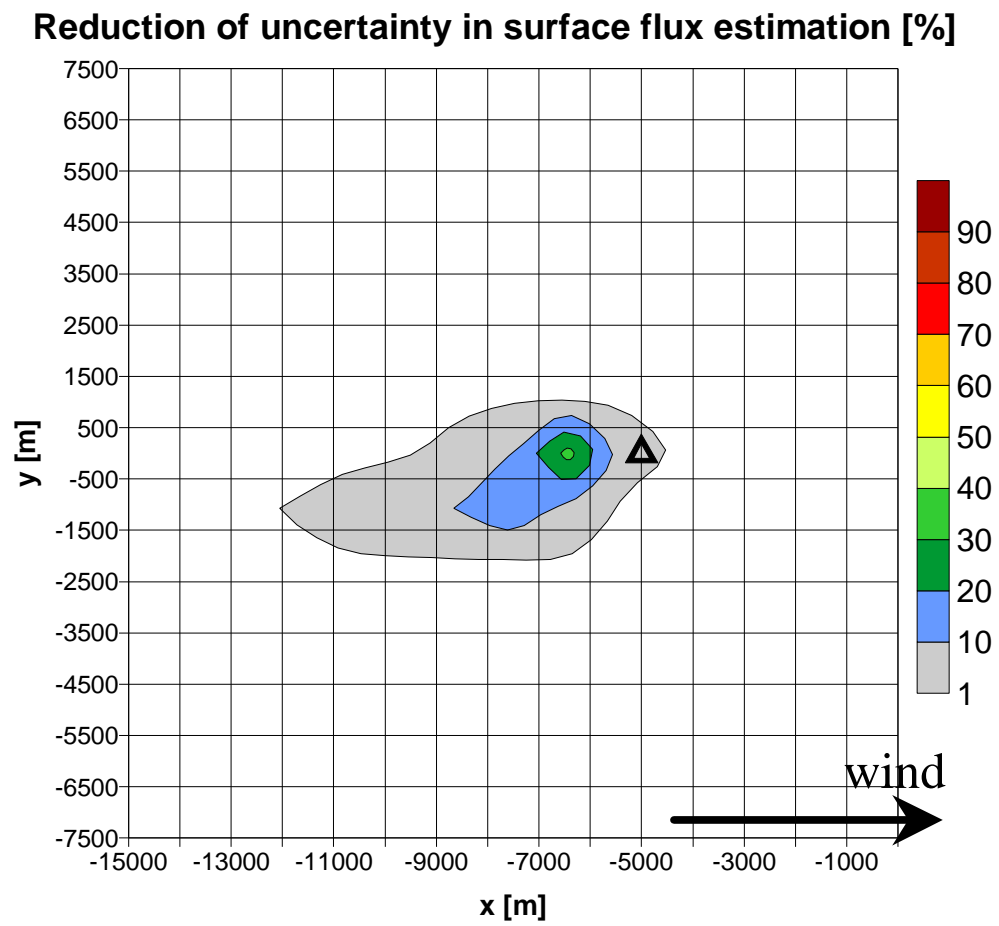
Approach:

- Lagrangian particle model coupled with LES to simulate depletion of CO₂ concentration in the PBL due to local uptake by vegetation.
- LES: CBL (U=5m/s, z_i=1500m) over homogenous terrain (constant heat flux)
- a grid of 1x1 km surface sources over 15x15 km domain
- Bayesian inversion technique to derive reduction of uncertainty in surface flux estimation
- reduction of uncertainty in surface flux estimation used to compare different sampling strategies

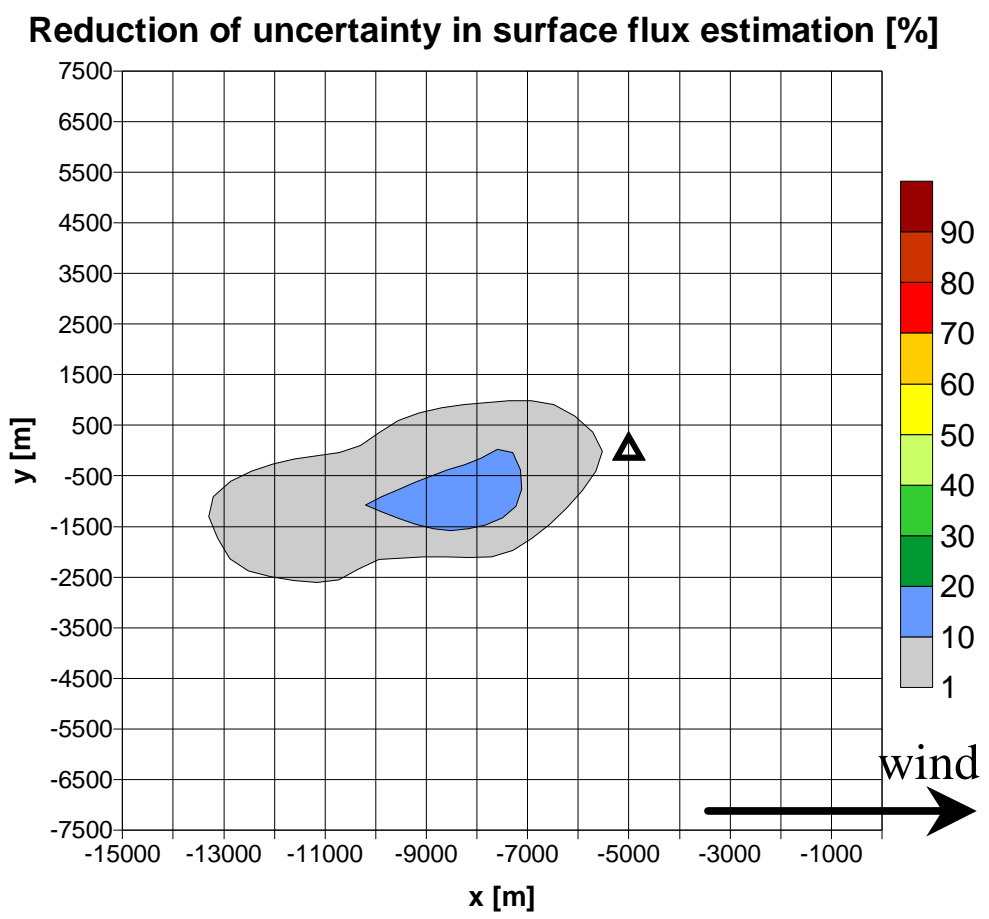
Sampling strategy:
a single sample, $z=100\text{m}$



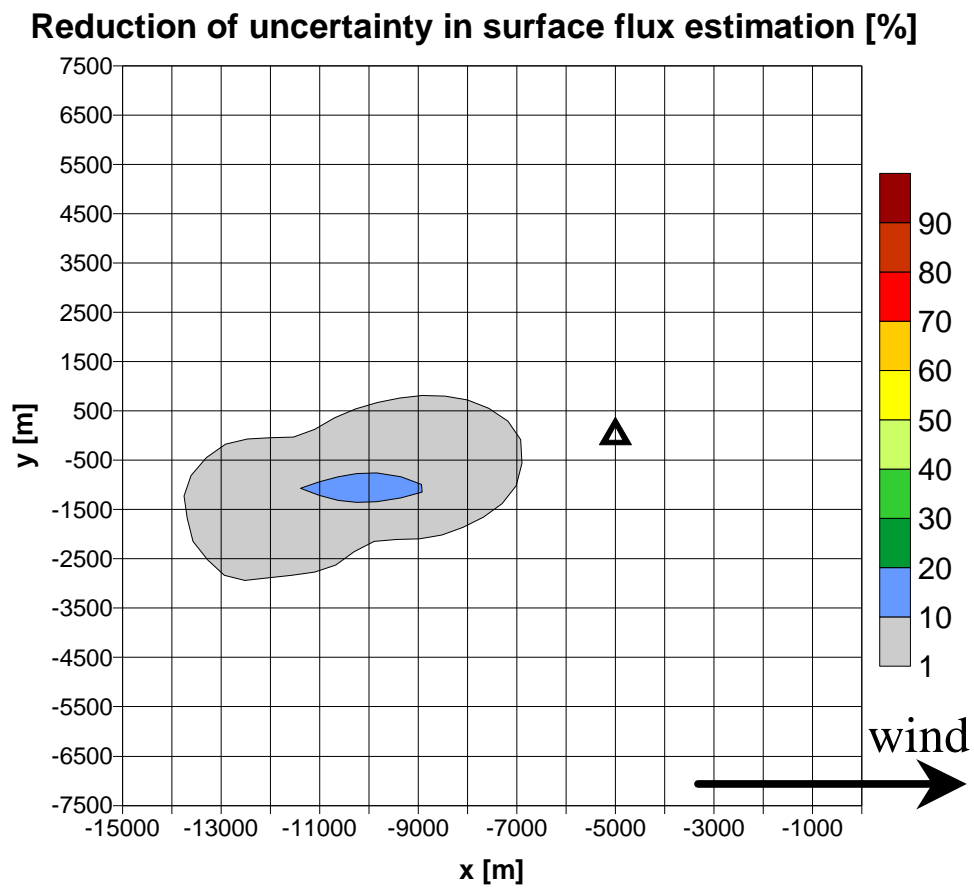
Sampling strategy:
a single sample, $z=200\text{m}$



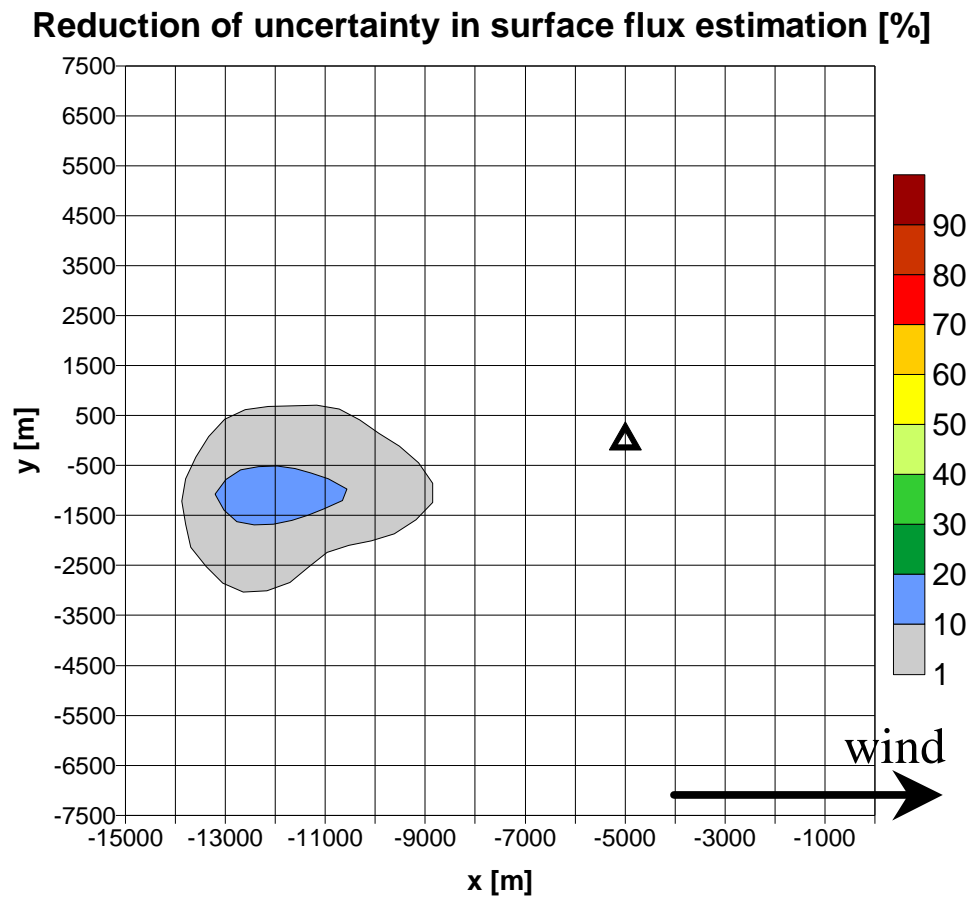
Sampling strategy:
a single sample, $z=400\text{m}$



Sampling strategy:
a single sample, $z=800\text{m}$

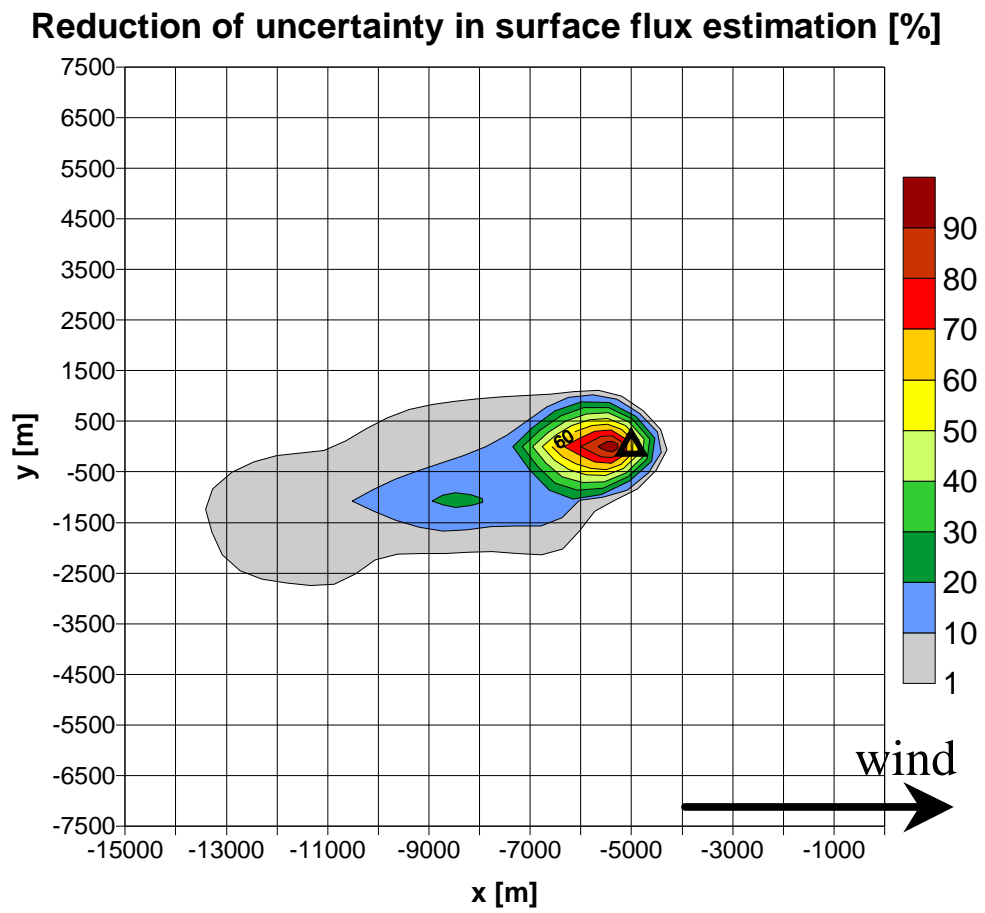


Sampling strategy:
a single sample, $z=1400\text{m}$



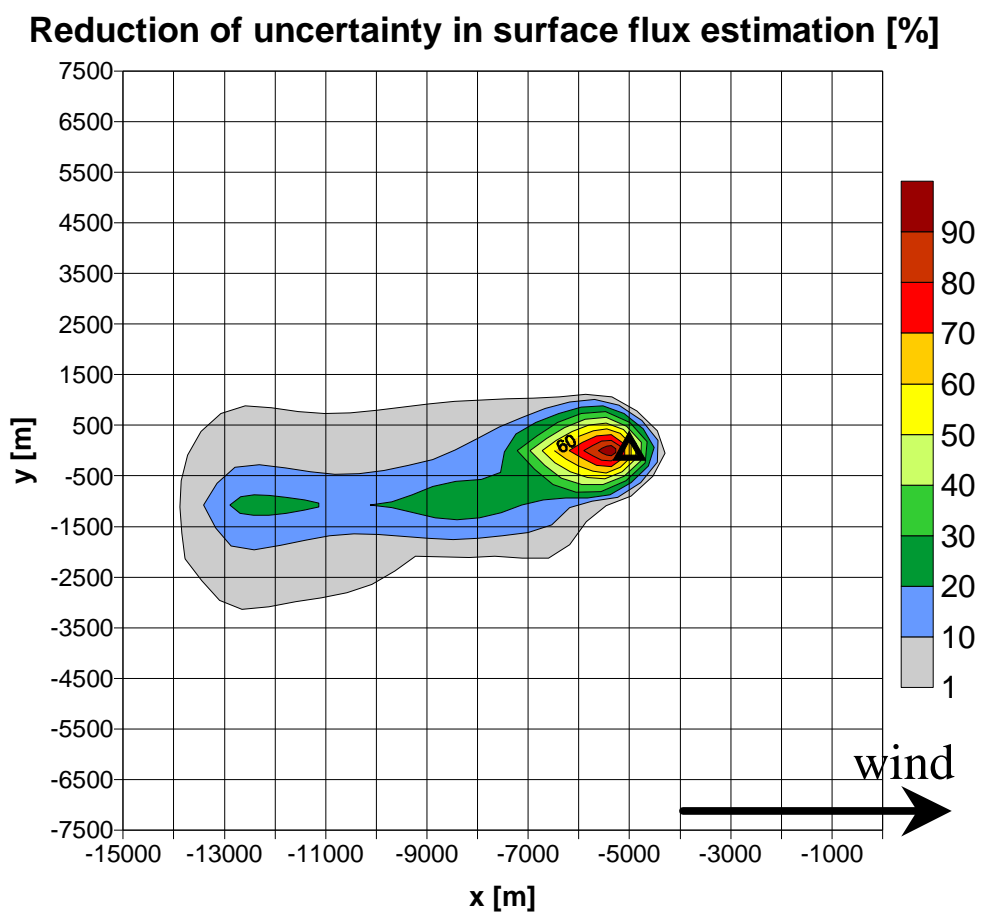
Sampling strategy:

6 level tower - 11, 30, 76, 122 244, 396m

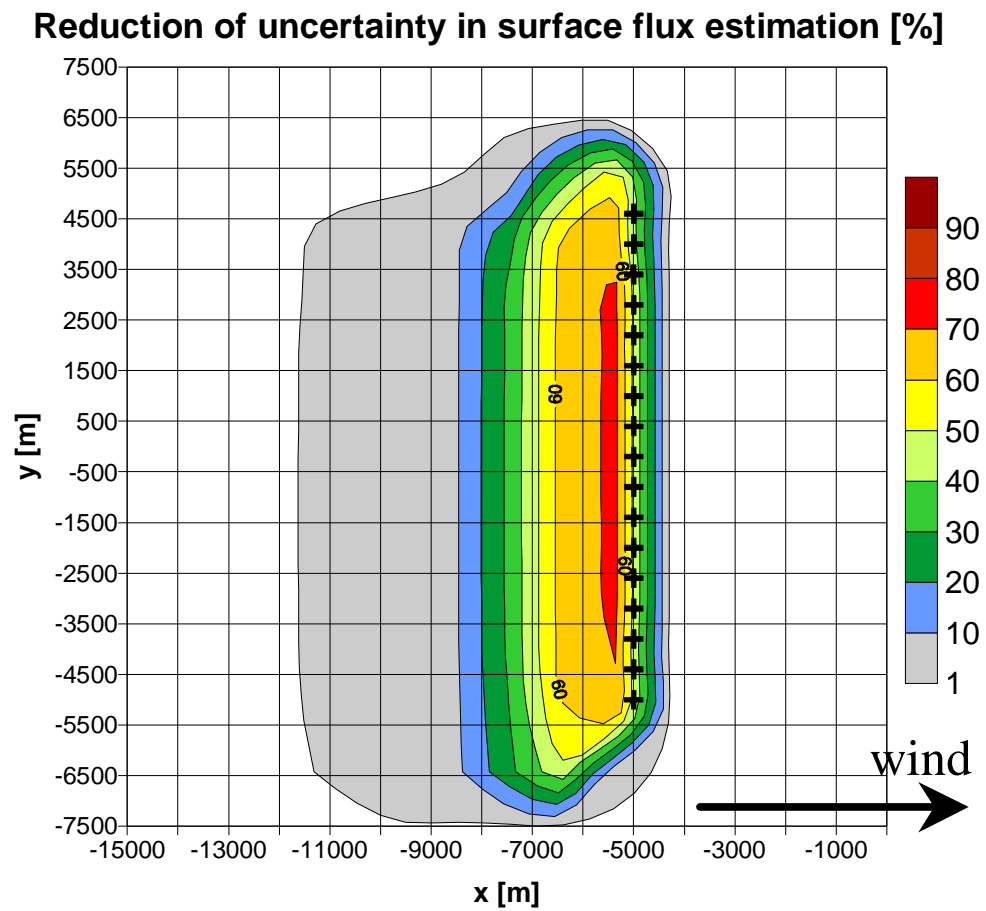


Sampling strategy:

vertical profile: 50, 150, 250, ..., 1650m

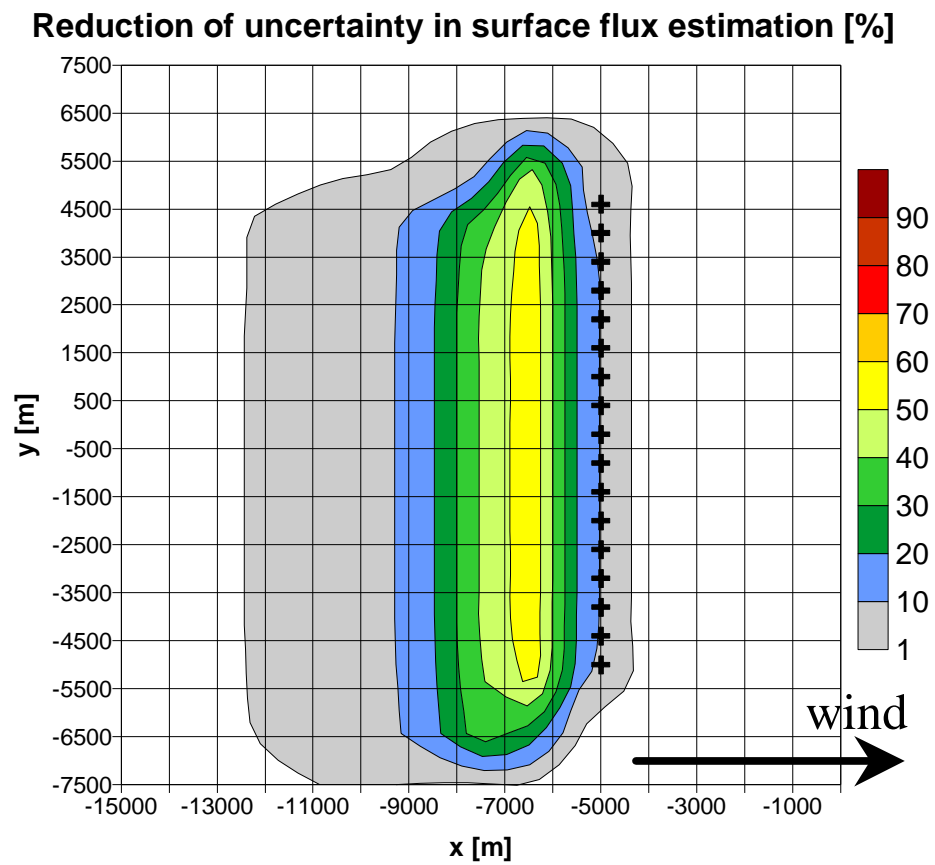


Sampling strategy: cross wind flight
y horizontal profile: $x=-5000\text{m}$, $z=100\text{m}$, $dy=200\text{m}$

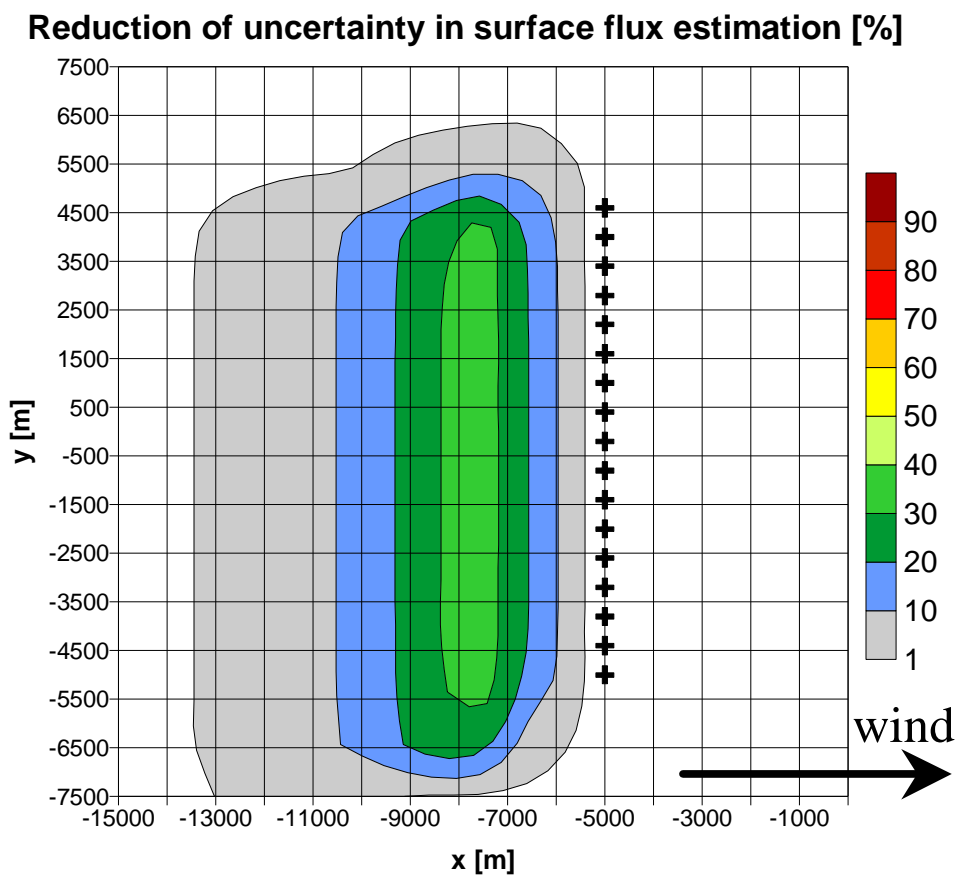


Sampling strategy: cross wind flight

y horizontal profile: $x=-5000\text{m}$, $z=200\text{m}$, $dy=200\text{m}$



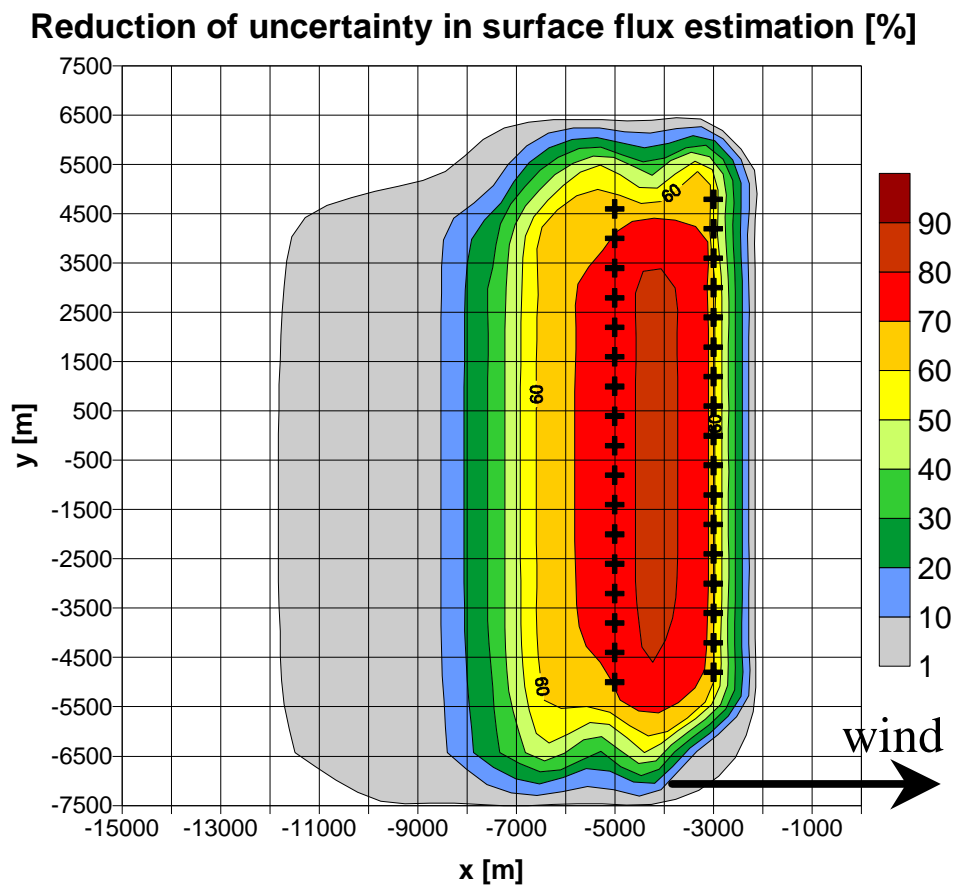
Sampling strategy: cross wind flight
y horizontal profile: $x=-5000\text{m}$, $z=400\text{m}$, $dy=200\text{m}$



Sampling strategy: cross wind flights

y horizontal profile: $x=-5000\text{m}$, $z=100\text{m}$, $dy=200\text{m}$

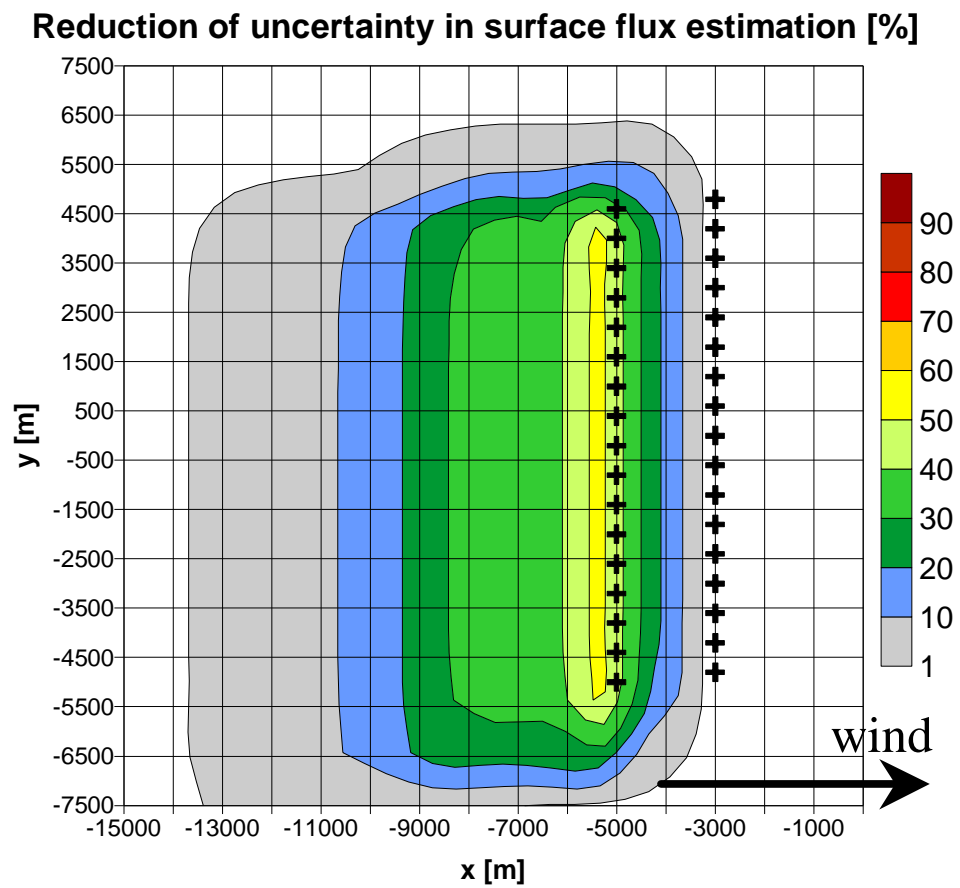
x horizontal profile: $x=-3000\text{m}$, $z=100\text{m}$, $dx=200\text{m}$



Sampling strategy: cross wind flight

y horizontal profile: $x=-5000\text{m}$, $z=400\text{m}$, $dy=200\text{m}$

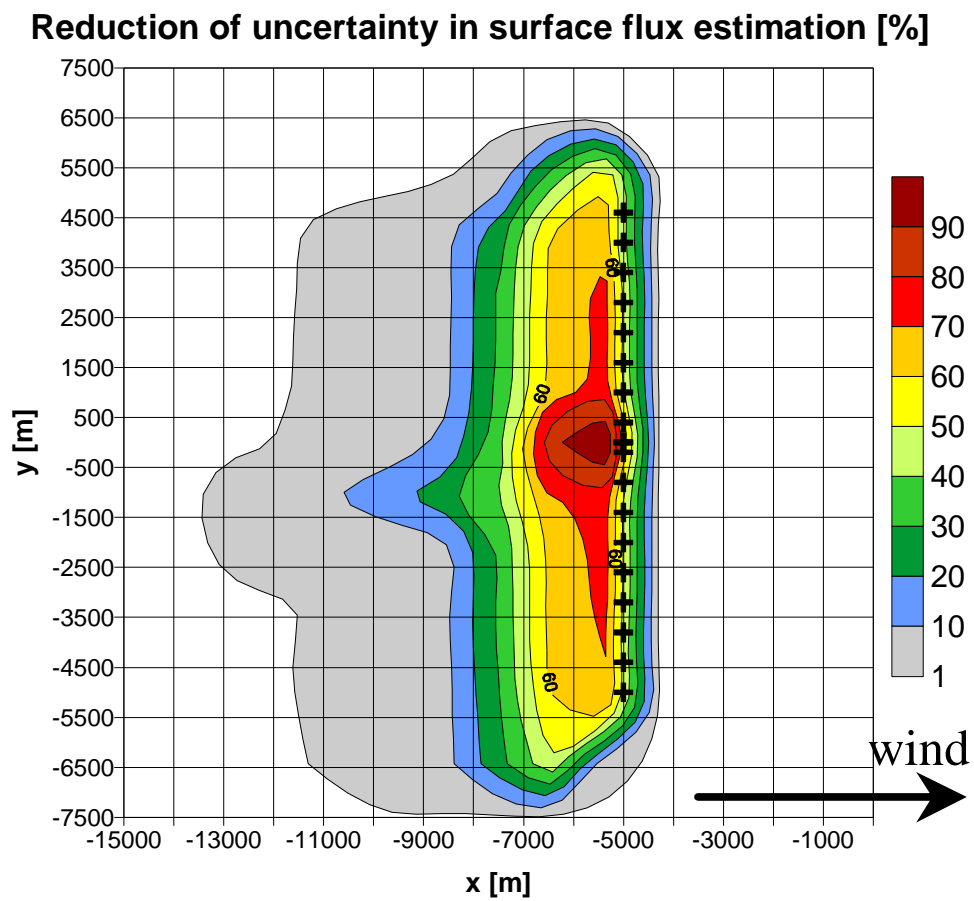
y horizontal profile: $x=-3000\text{m}$, $z=400\text{m}$, $dy=200\text{m}$



Sampling strategy: tower + cross wind flight

6 level tower - 11, 30, 76, 122, 244, 396m

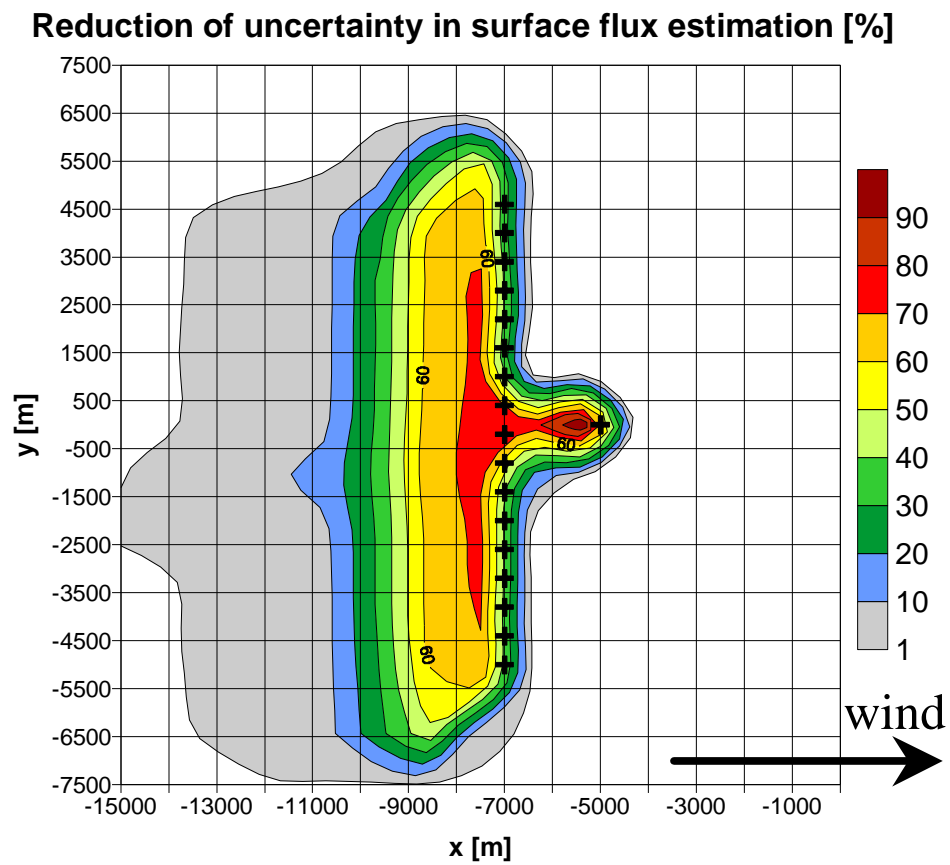
y horizontal profile: $x=-5000\text{m}$, $z=100\text{m}$, $dy=200\text{m}$



Sampling strategy: tower + cross wind flight

6 level tower - 11, 30, 76, 122, 244, 396m

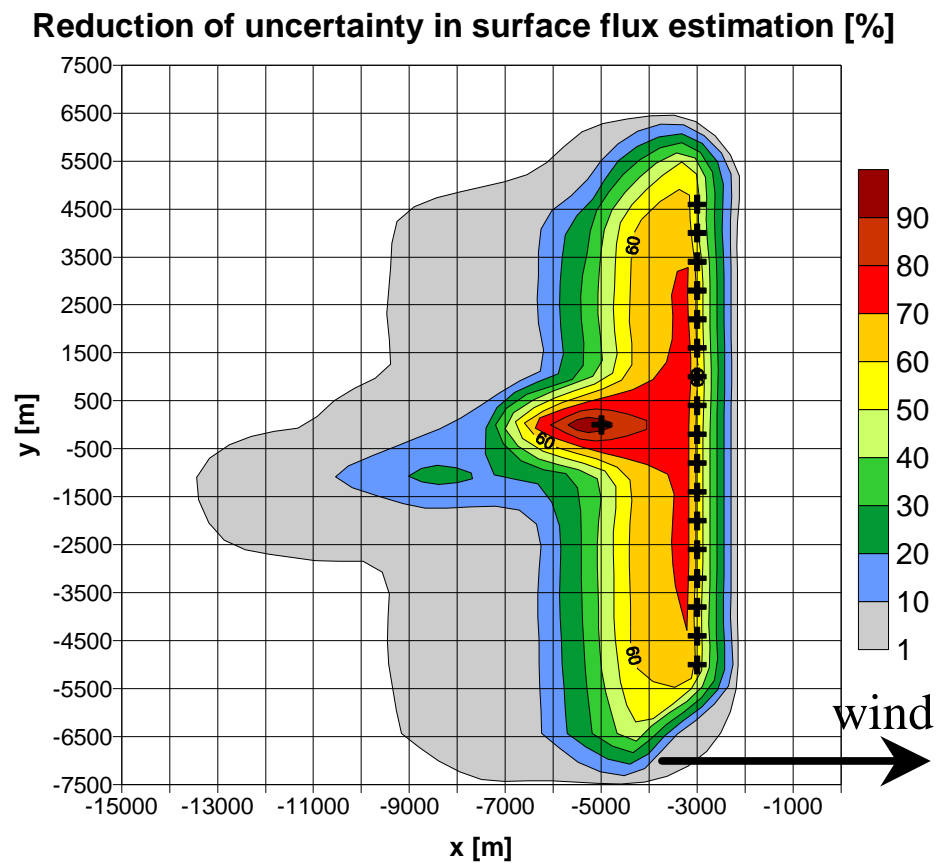
y horizontal profile: $x=-7000\text{m}$, $z=100\text{m}$, $dy=200\text{m}$



Sampling strategy: tower + cross wind flight

6 level tower - 11, 30, 76, 122, 244, 396m

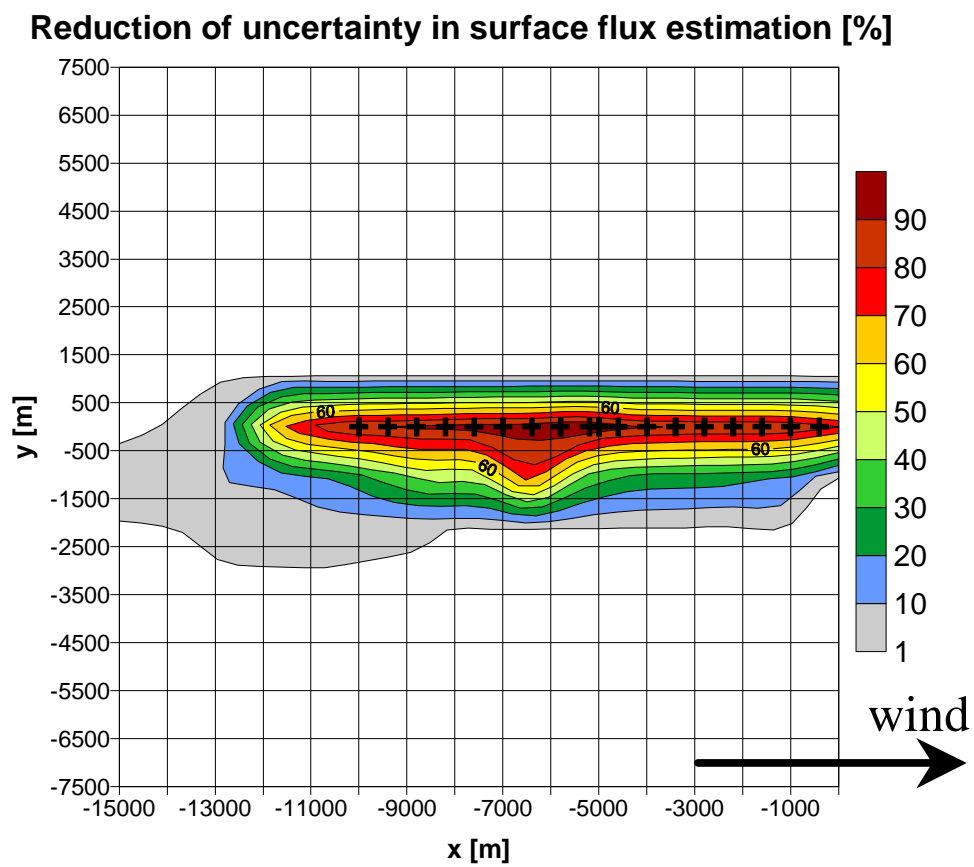
y horizontal profile: $x=-3000\text{m}$, $z=100\text{m}$, $dy=200\text{m}$



Sampling strategy: tower + along wind flight

6 level tower - 11, 30, 76, 122, 244, 396m

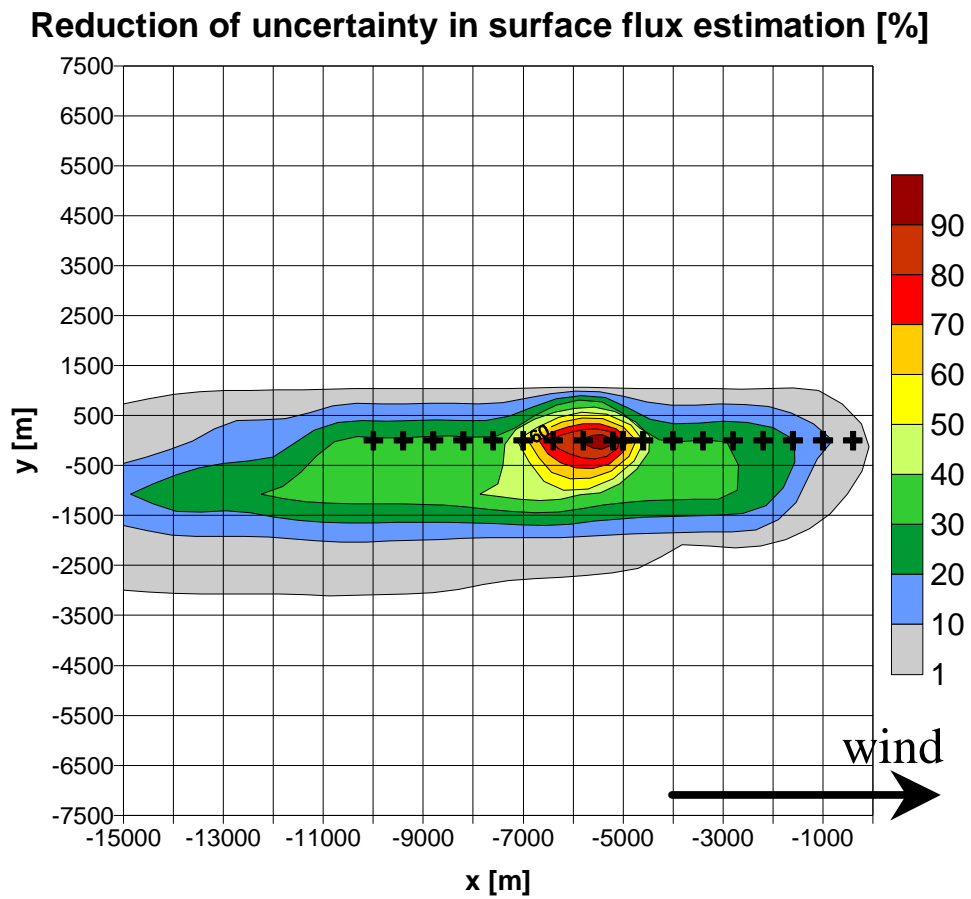
x horizontal profile: $y=0\text{m}$, $z=100\text{m}$, $dx=200\text{m}$



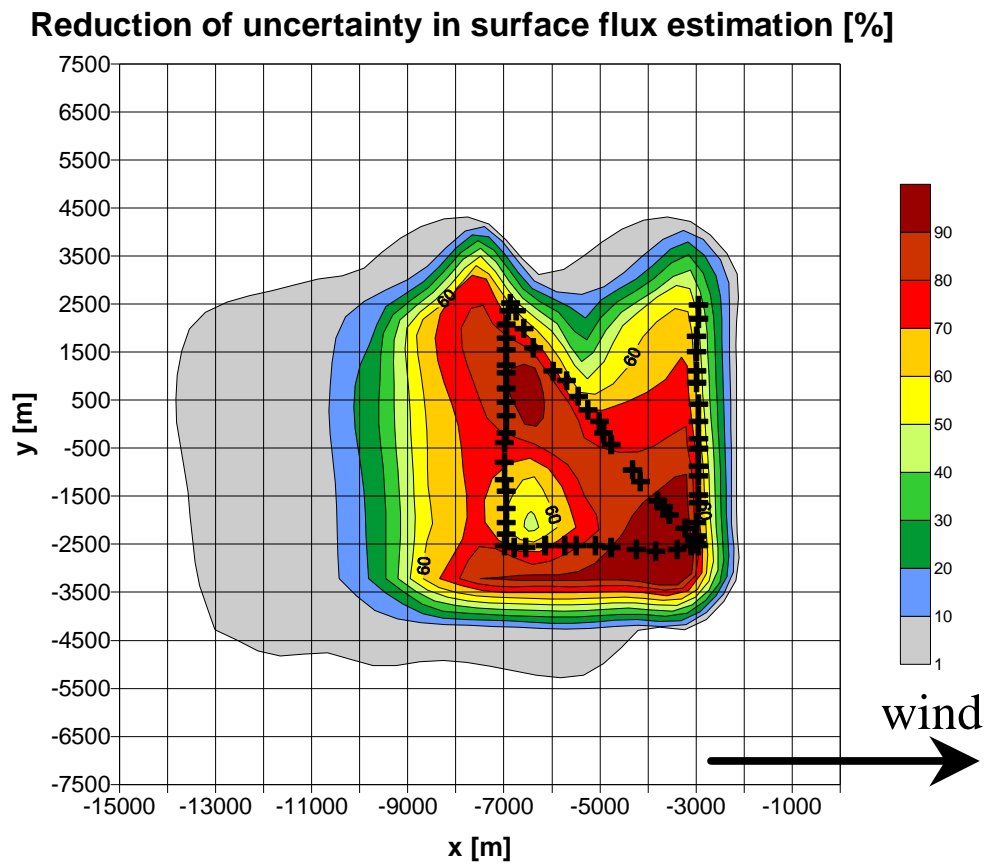
Sampling strategy: tower + along wind flight

6 level tower - 11, 30, 76, 122 244, 396m

x horizontal profile: $y=0\text{m}$, $z=400\text{m}$, $dx=200\text{m}$



Sampling strategy:
“envelope” flying pattern, $z=100\text{m}$



Sampling strategy:
“envelope” flying pattern, $z=100\text{m}$

