Extrapolation of the measured wind data using CFD model implemented in the WindSim Software package

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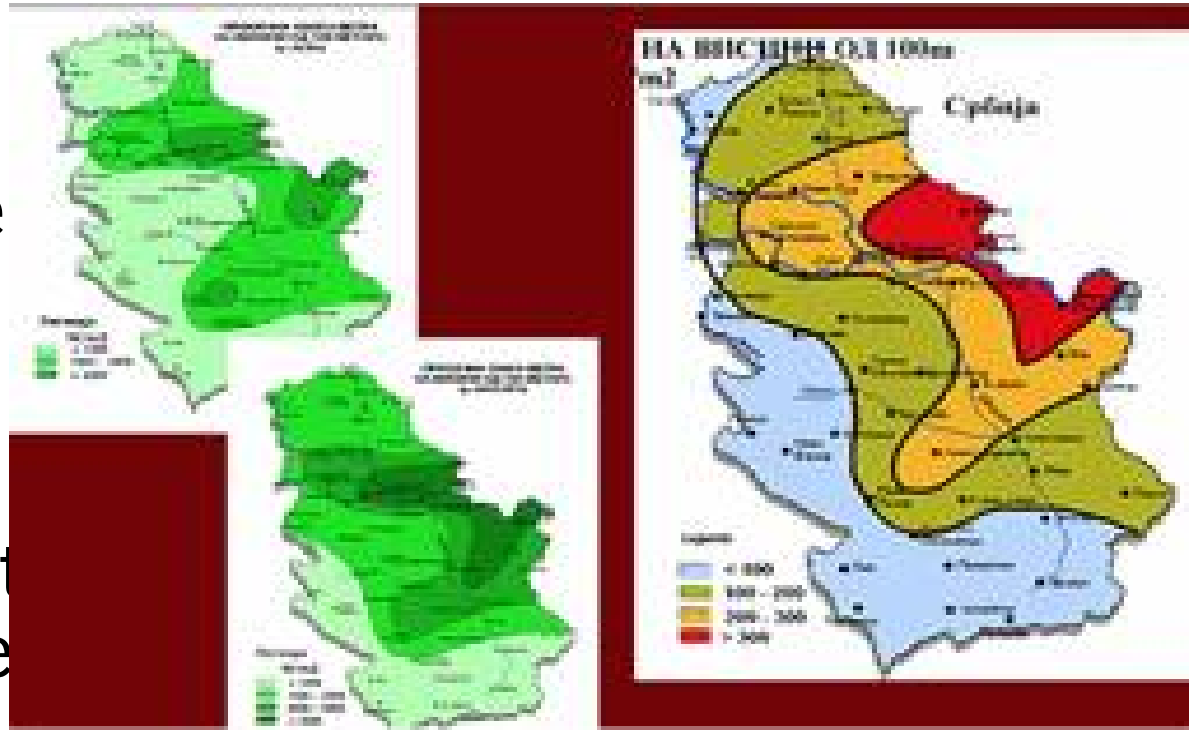
Outline

- WindSim CFS Model
- Location Šušara fields
- Measurement results
- Simulated results
- Future research

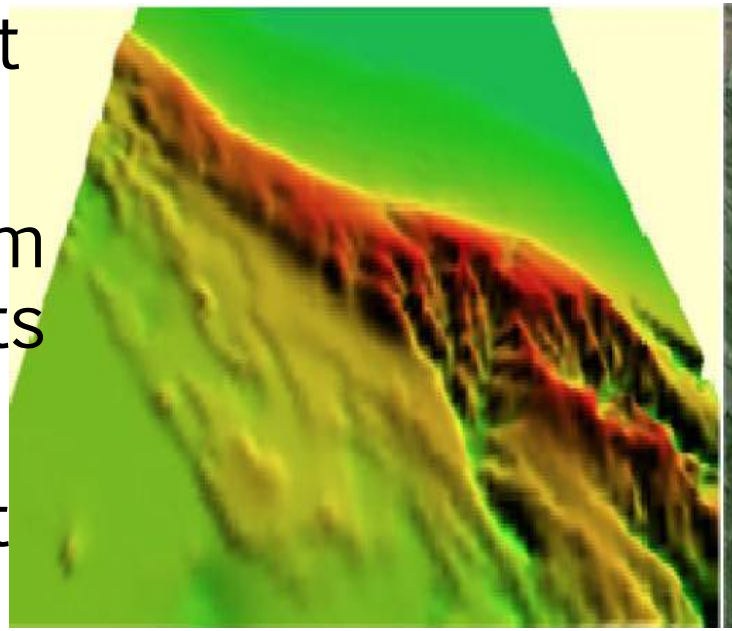
CFS Model

- Computational Flow Dynamics (CFD) - numerical model for solving fluid dynamics equations
- Model implemented solving simplifie RANS - time-averaged equations of motion for fluid flow
- The main idea - Reynolds decomposition, instantaneous quant is decomposed into its time-average and fluctuating quantities
- Wind speed map at 100m



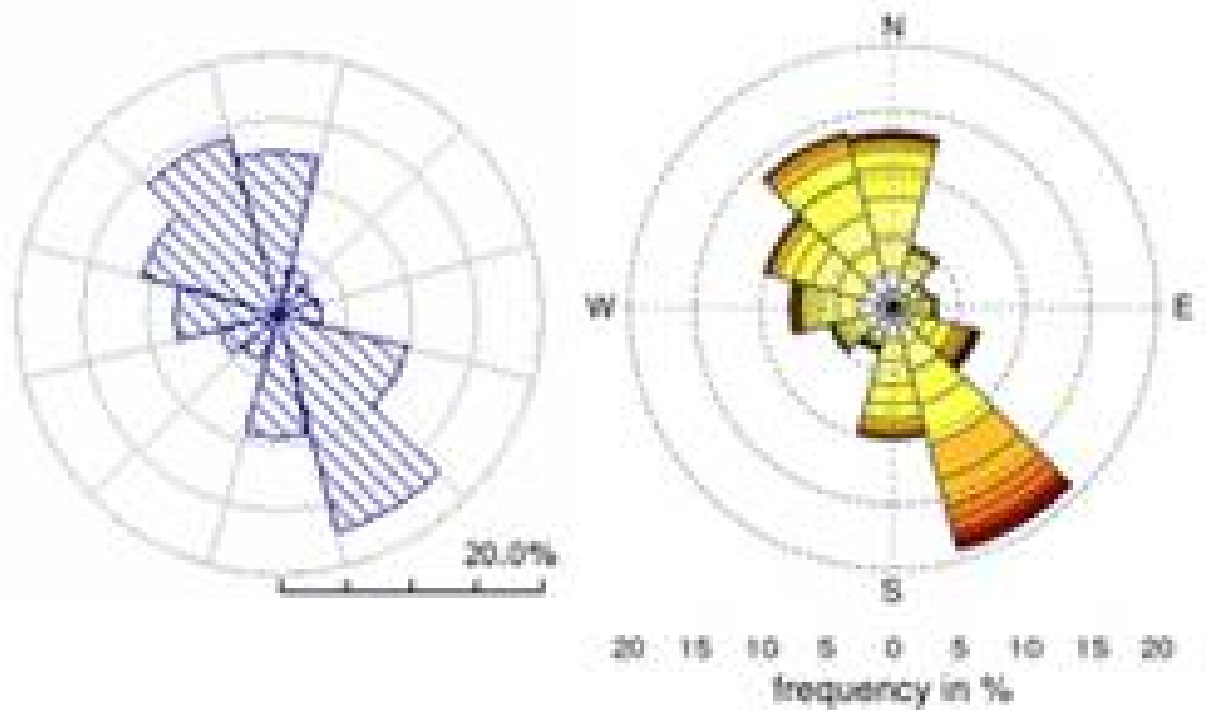
Šušara fields location

- Area with the greatest wind potential in South-East (SE) Banat
- Unique geo-morphological configuration 10km long and 50 m wide cultivated sand dune, heights 40m – 100m
- Hardware: two 50m measurement masts NRG TallTower, anemometers NRG #40C placed at 30m/40m/50 m, wind wanes NRG #200P at 30m/50m



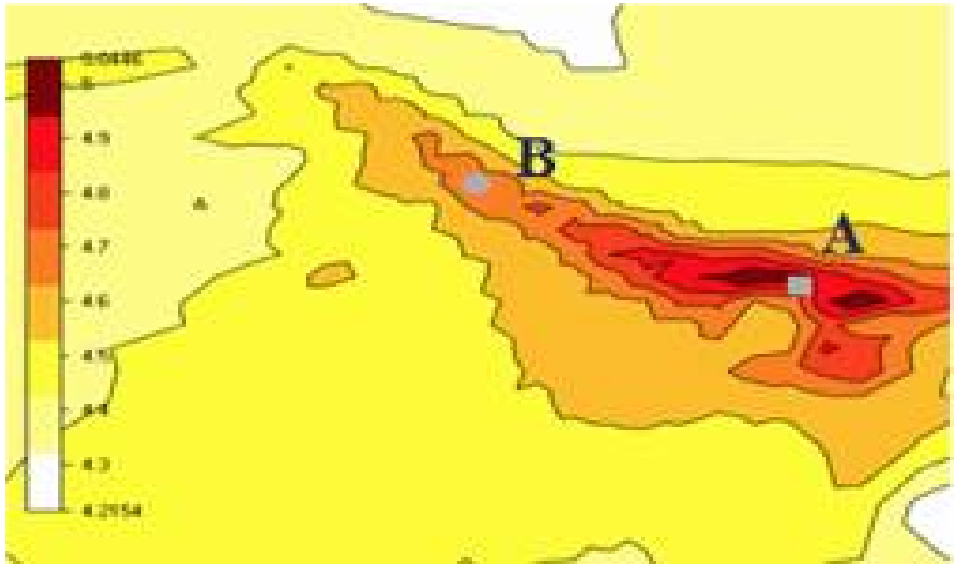
Results

- Measurement stations data gathered during the 5 year perioc
- Data processed in OWC wizard (module of WAsP wind assessment tool)
- Resulting wind roses for both masts.
- Used as referent measured value compared with the simulated wind roses



Results

- Mean wind speed from at the location of two measurement masts
- Wind speed prediction at 30m above the ground
- Area around the mast A - the greatest wind potential
- Area around mast B - the lowest wind potential



Conclusion

- Results confirmed superiority of the CFD model in case of rugged complex terrain
- Measurement masts approximately situated at locations with highest and lowest wind potentials
- Important for future wind power harvesting and climatology conditions analysis
- Future model analysis - sector testing and climatology extrapolation to different heights

Thank you for your attention!!!