

# ***METEOTEST***

WindSim User Meeting 2014

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# Meteotest: The company



- Founded 1981
- Independant private company
- 35 employees
- Bern, Switzerland
- Since 2003 using WindSim



# The company



- Founded 1981
- Independent private company
- 35 employees
- Research and development



**Wind Modeling in Mountains: Intercomparison and Validation of Models** **EWEC 2003**

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# The company

- Founded 1981
- Independant private company
- 35 employees
- Bern, Switzerland
- Since 2003 using WindSim
- Meteotest at 8 of the 9 user meetings (at least)



## Outlook:

- Elected from government to establish wind atlas of Switzerland (2014)

# Our strength

- Wind energy in complex terrain
- Wind energy in icing conditions

# Our strength



Gütsch, Switzerland 2'331 m asl

# Our strength



Installation of a met mast in the alps

# Our strength



Gries, 2'465 m asl

# Our strength



→ New WindSim Add-on:  
Calculation of production loss for icing conditions ??



Measurement campaigns and  
calculation of production loss in icing conditions

# Recent experiences with WindSim

- Upgrade of 'old' projects to newer versions works good
- Very happy with GCV solver, no more warnings like:

**Divergence occurred for this sector!**

**Please check your gridding  
and your property settings  
and rerun the sector**

→but: time consuming, many iterations

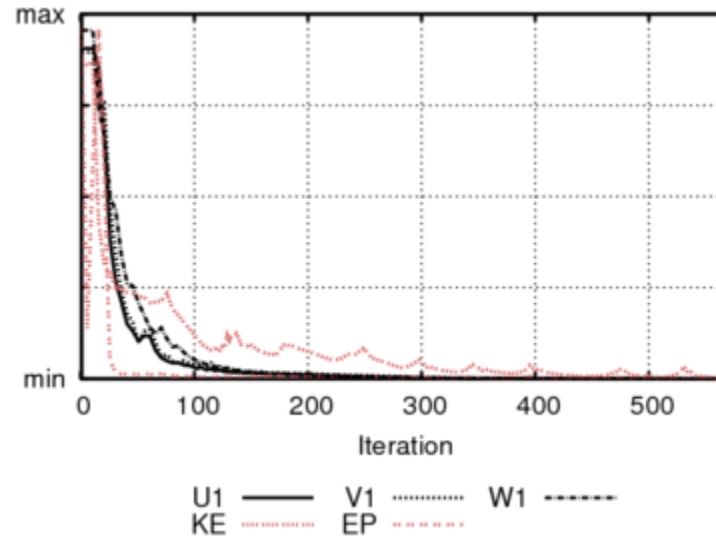
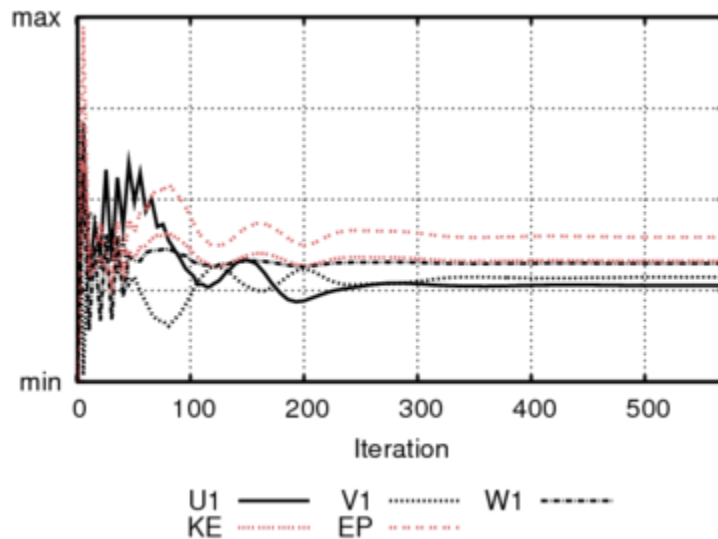
# GCV solver: project **A** complex



| Date     | Time     | Sector | Solver | Conwiz | #Iter | #Iter exe | Time exe (S.) |
|----------|----------|--------|--------|--------|-------|-----------|---------------|
| 07.04.14 | 14:05:30 | 000    | GCV    | No     | 100   | 100       | 02:22:44 (-)  |
| 10.04.14 | 17:24:32 | 000    | GCV    | No     | 50    | 50        | 01:14:41 (-)  |
| 14.04.14 | 23:45:56 | 000    | GCV    | No     | 150   | 150       | 03:33:43 (-)  |
| 16.04.14 | 18:20:51 | 000    | GCV    | No     | 50    | 50        | 01:16:28 (-)  |
| 17.04.14 | 08:58:56 | 000    | GCV    | No     | 50    | 50        | 01:13:54 (-)  |
| 21.04.14 | 19:23:41 | 000    | GCV    | No     | 100   | 100       | 02:25:57 (-)  |
| 24.04.14 | 19:15:05 | 000    | GCV    | No     | 70    | 70        | 01:42:14 (-)  |
| 07.04.14 | 19:40:18 | 030    | GCV    | No     | 100   | 100       | 02:22:55 (-)  |
| 10.04.14 | 18:38:58 | 030    | GCV    | No     | 50    | 50        | 01:13:56 (-)  |
| 15.04.14 | 03:17:14 | 030    | GCV    | No     | 150   | 150       | 03:30:31 (-)  |
| 16.04.14 | 19:37:44 | 030    | GCV    | No     | 50    | 50        | 01:15:42 (-)  |
| 17.04.14 | 09:10:57 | 030    | GCV    | No     | 50    | 3         | 00:10:35 (C)  |

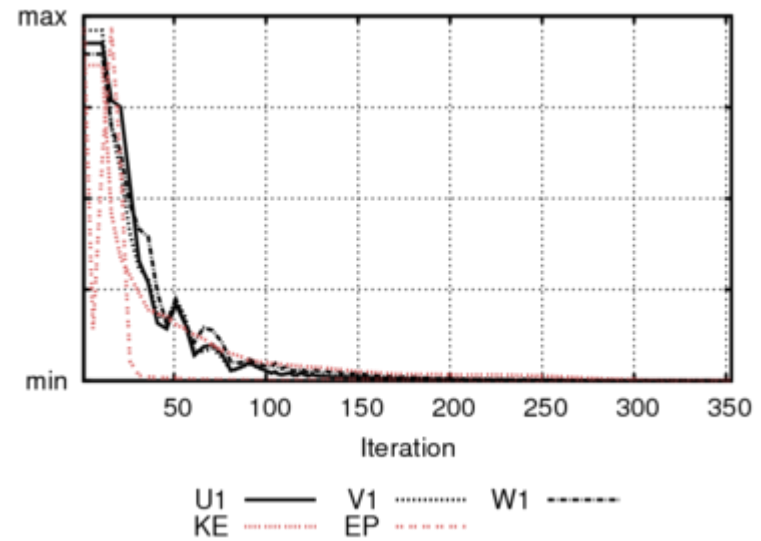
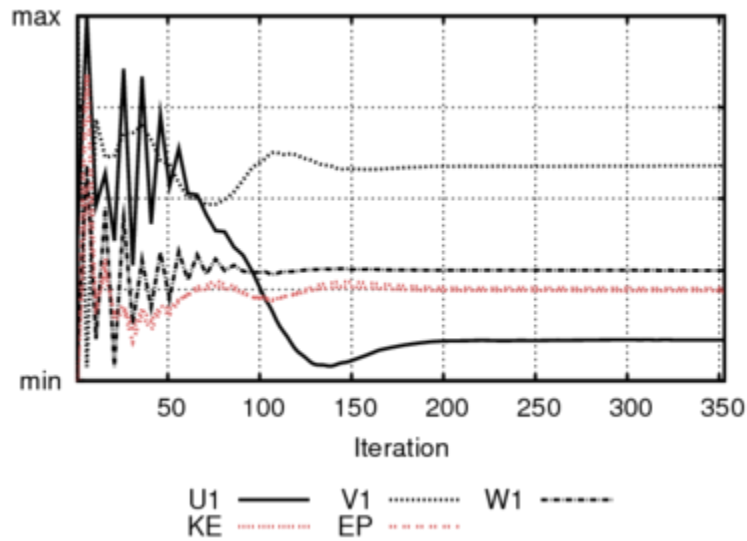
- sector 000:  
570 iterations (~15 h), convergence criteria **not** fulfilled
- sector 030:  
353 iterations (~10 h), convergence criteria fulfilled

# GCV solver: project **A** complex



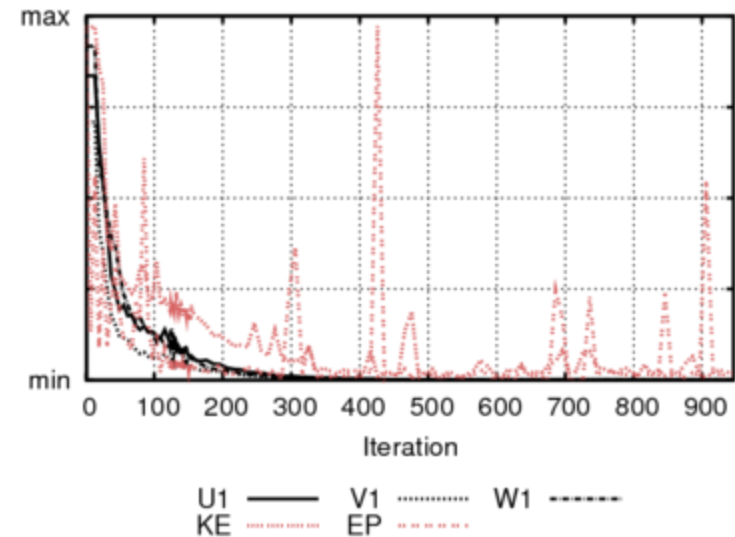
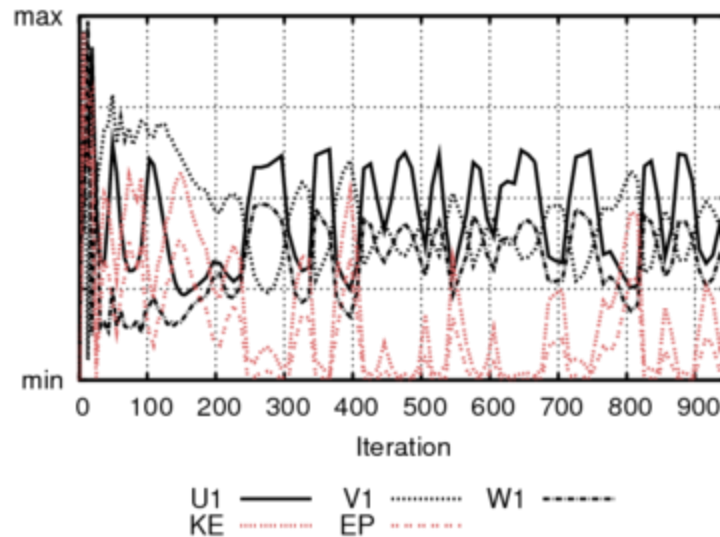
- sector 000:  
470 iterations convergence criteria not fulfilled

# GCV solver: Project **A** complex



- sector 030:  
353 iterations (~10 h), convergence criteria fulfilled

# GCV solver: Project **B** very complex



- sector 090  
970 iterations ~30 hours
- luckily no wind from the 090

# Turbine assessment file

- A lot of information for each turbine site
- Average, min, max values
- Sectorwise values
- No weighting



turbines\_assessment\_clim001



AEP Gross

AEP Net

AEP Wake losses

Mean wind speed

Mean wind speed (WAKE reduced)

Mean wind speed ref

Speed-up

Speed-up (WAKE reduced)

Inflow angle max

Inflow angle min

Inflow angle

Inflow angle max abs(min,max)

Wind shear alpha max

Wind shear alpha min

Wind shear alpha

I\_rep

I\_eff

Air density

A (with WAKES) (Sum)

k (with WAKES) (Sum)

A (without WAKES) (Sum)

k (without WAKES) (Sum)

nSectors

AEP Gross (0° )

AEP Net (0° )

AEP Wake losses (0° )

# Turbine assessment file

1. Is that possible?

$I_{rep}$  and  $I_{ref}$  at 125 m above ground:

| User label |     | LW1    | LW2    | LW3    | LW4    | LW5    | LW6    |
|------------|-----|--------|--------|--------|--------|--------|--------|
| $I_{rep}$  | [%] | 41.237 | 34.385 | 51.431 | 42.842 | 86.391 | 66.054 |
| $I_{eff}$  | [%] | 40.661 | 34.387 | NaN    | 42.755 | 84.031 | 64.996 |

2. Is that possible?

$I_{ref} < I_{eff}$

rounding problem?

# WindSim support



Good and fast support during the last years – thanks!

**Thank you for  
your attention!**

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