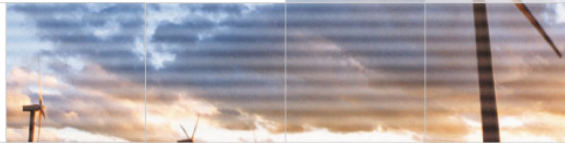


PBL SCHEMES IN MM5 MODEL

WORKSHOP GERMANY(OLDENBURG)

23-26 FEBRUARY

San Isidro, MJ & Loureiro, YL



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TEST RUN

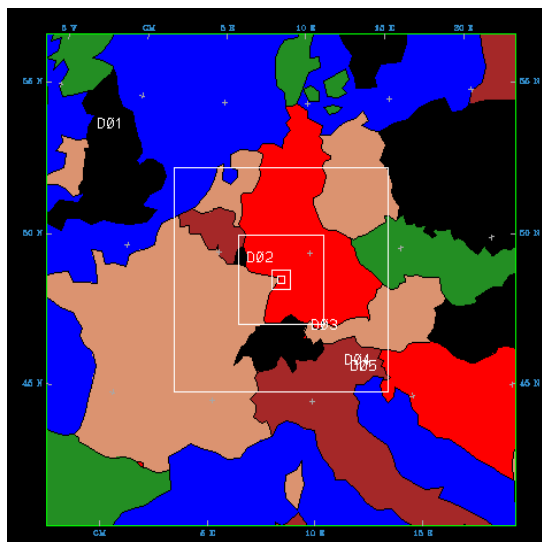
Centered Domains

Central Latitude

49.0925

Central Longitude

8.426



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TEST RUN



- **Date:** 03/10/23 – 03/10/28
- **Type of data:** FNL Data
- **Domains to process:** 5 Domains
- **Grid Dimensions in Y, X Direction:** 23, 31, 37, 25, 25
- **Grid Distance:** 81, 27, 9, 3, 1
- **Resolution of Terrain and Landuse (Km):** 56, 19, 9, 4, 1
- **Nesting:** Two way nests
- **Sigma Levels:** 23
- **FDDA:** FNL Data
- **Planetary Boundary Layer:** MRF, Blackadar, G.Seaman

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TEST RUN



Richardson Number (Ri)

$$R_i = \frac{g}{T} \frac{(\Delta T / \Delta z)}{(\Delta u / \Delta z)^2}$$

- **Ri > 0** stable condition
- **Ri < 0** unstable condition
- **Ri = 0** neutral condition

Two Domains (ΔT)

03/10/23 – 03/10/28



Ri < 0 unstable condition

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TEST RUN



PBL SCHEMES USED

MRF Used in AVN model. Suitable for high-resolution
Computational Time: 232 min

BLACKADAR For high resolution in surface layer < 100 m thick
Sensitive to synoptics situations (geostrophic wind)
Computational Time: 270 min

GAYNO-SEAMAN Conserved variable potential temperature
allowing to operate in saturated conditions
Computational Time: 269 min

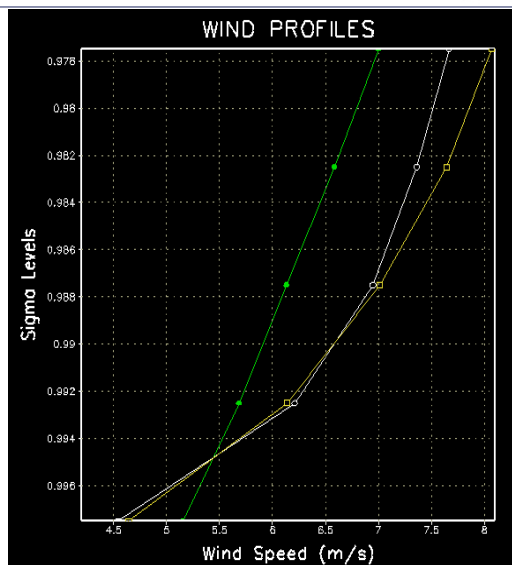


RESULTS



MRF ———
BLACKADAR ———
GAYNO ———

$\sigma=0.9975$ 18.12 m
 $\sigma=0.9925$ 54.46 m
 $\sigma=0.9875$ 90.94 m
 $\sigma=0.9825$ 127.55 m
 $\sigma=0.9775$ 164.30 m

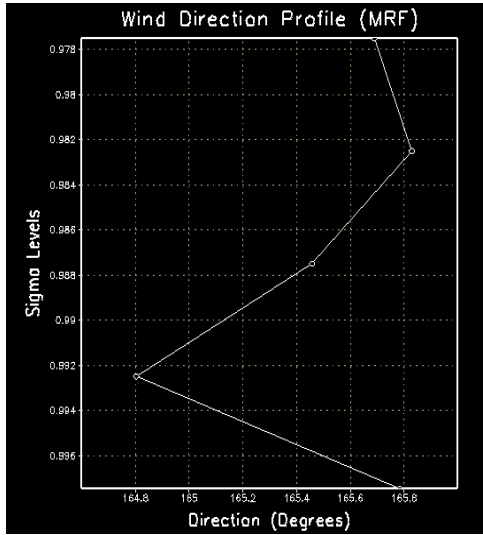


RESULTS



MRF —
 BLACKADAR —
 GAYNO —

| | |
|-----------------|----------|
| $\sigma=0.9975$ | 18.12 m |
| $\sigma=0.9925$ | 54.46 m |
| $\sigma=0.9875$ | 90.94 m |
| $\sigma=0.9825$ | 127.55 m |
| $\sigma=0.9775$ | 164.30 m |

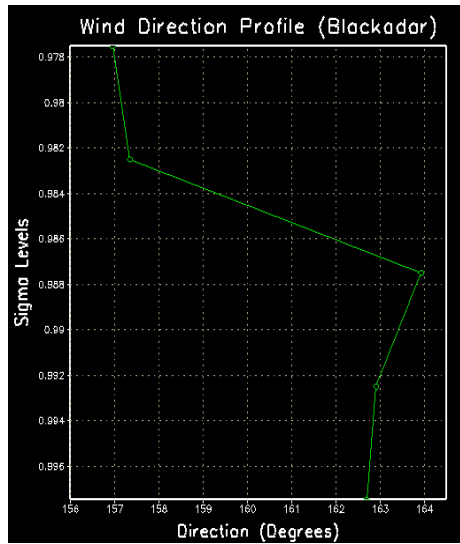


RESULTS



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 BLACKADAR —
 GAYNO —

| | |
|-----------------|----------|
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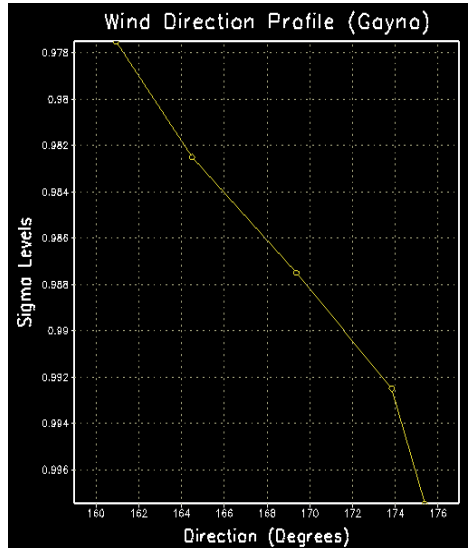


RESULTS



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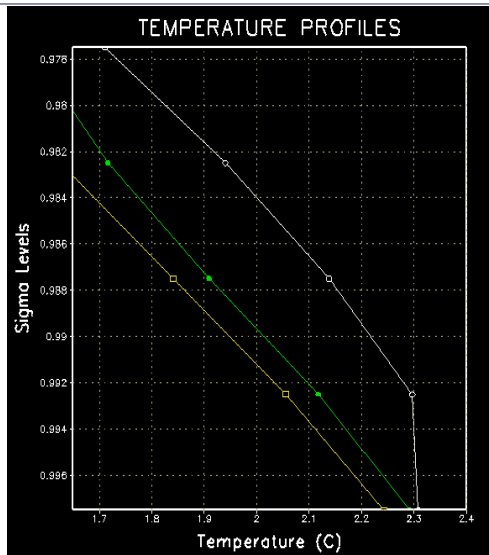


RESULTS



MRF —
 BLACKADAR —
 GAYNO —

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 $\sigma=0.9775$ 164.30 m



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FUTURE WORK



To Carry out a **Sensitivity Analysis** on PBL schemes:

- To run MM5 for each PBL schemes
 - At least 6 months
 - Output Data (Hourly)
- To compare with measurement data
 - rms (root mean square errors) (analysis, predictions...)

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