JOMOPANS End Event

JOINT MONITORING PROGRAMME FOR AMBIENT NOISE IN THE NORTH SEA

WP6 Combination
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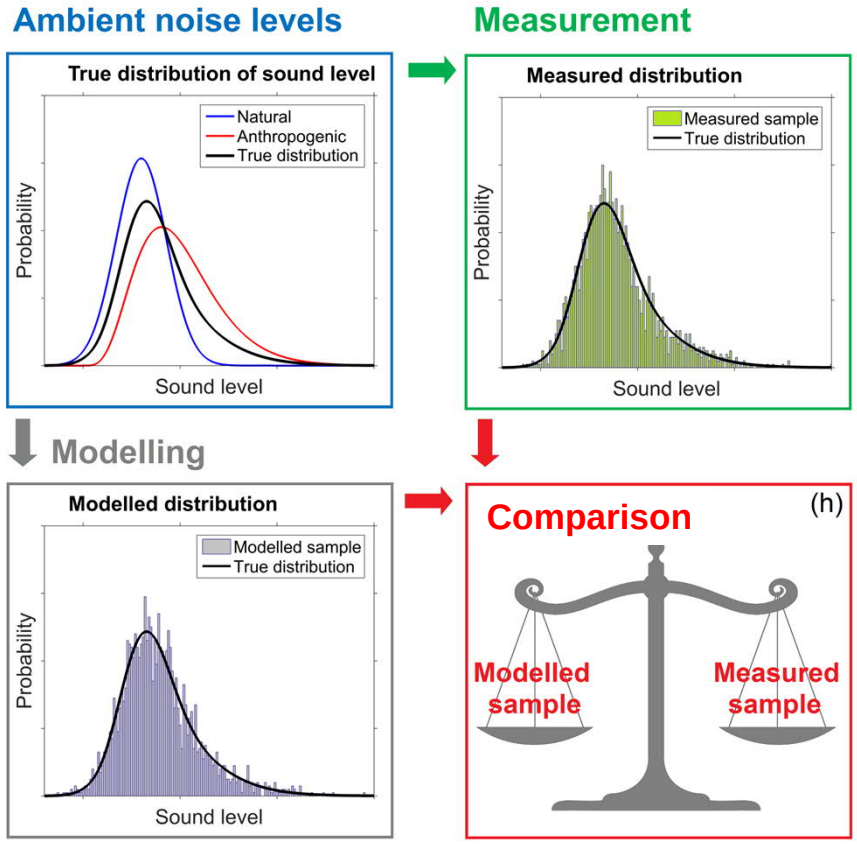
Concept for WP6

- Compare distribution of measured and modelled noise
- Identify sources of error/ uncertainty
- Optimise modelling and measurements
- Produce confidence maps of final outputs



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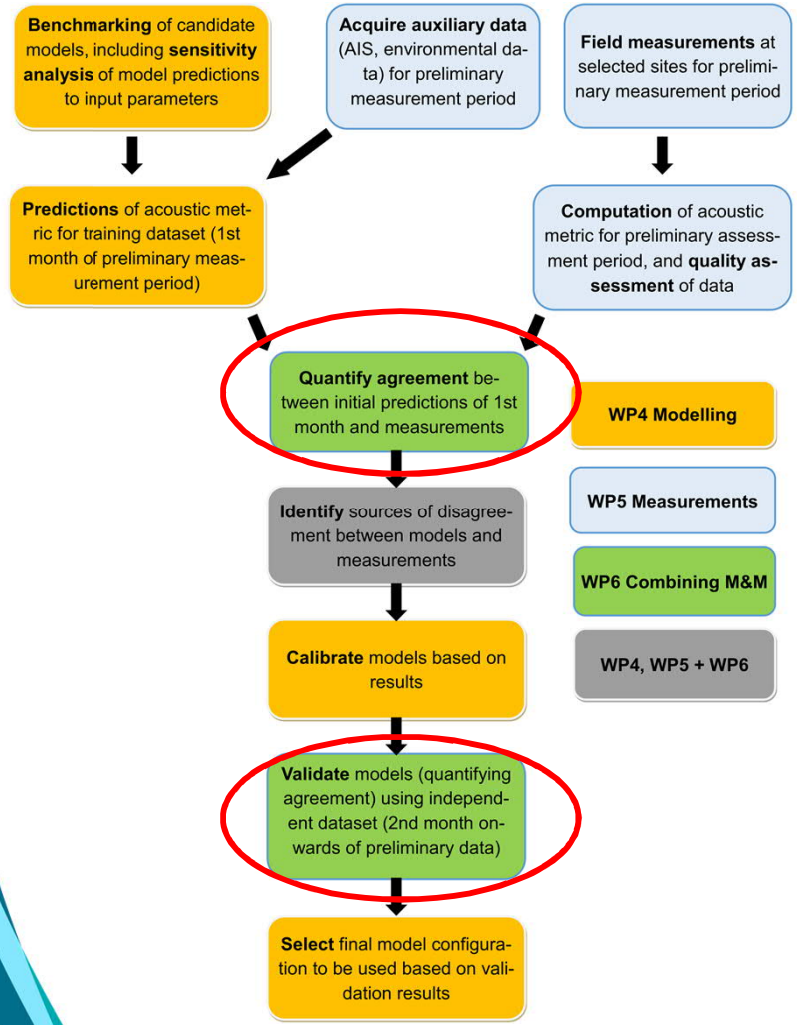
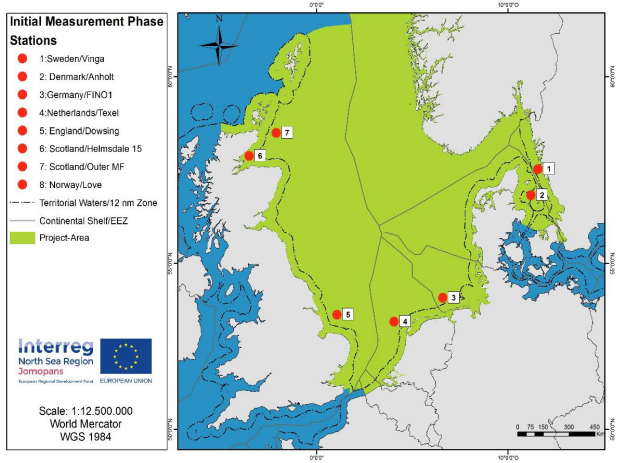


Iteration 1 and Iteration 2 predictions compared to field measurements at 8 JOMOPANS stations



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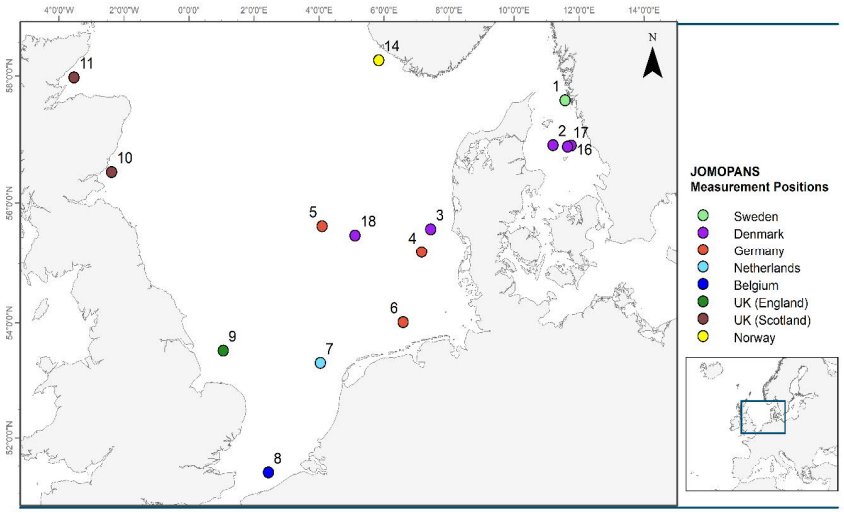
Compared final model for nearest grid positions to 2019 field **meas**urements for 15 JOMOPANS stations

- Spectral
  - 1/3 octave frequencies,
  - D1 20-160 Hz
  - D2 200-1600 Hz
  - D3 2000 – 16000 Hz
  - BB 20-20000 Hz.
  - Used P50 for wider comparisons.
- Spatial and temporal



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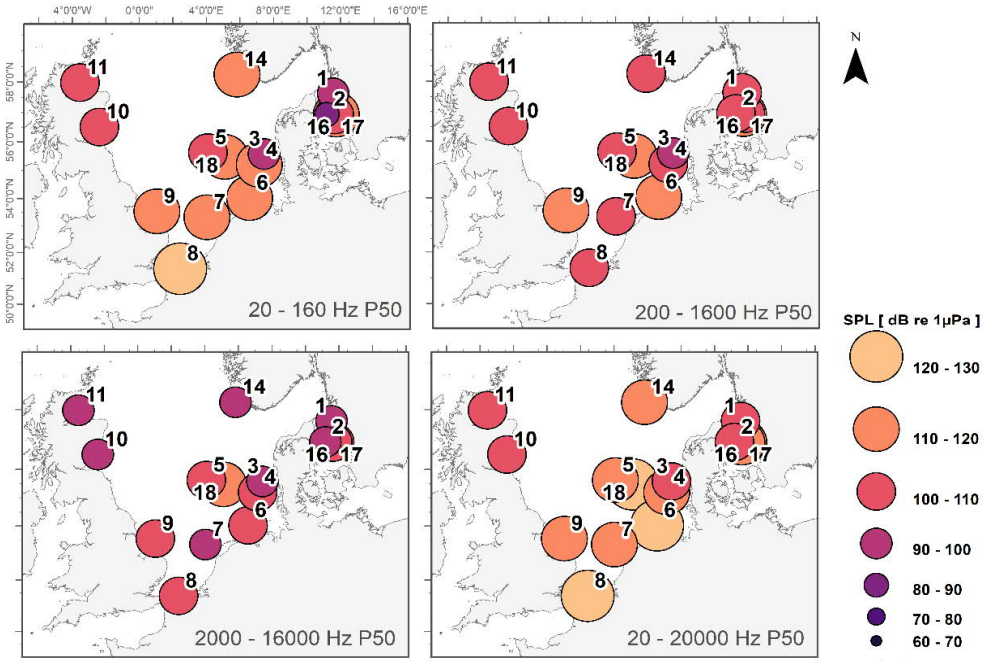
Measurements



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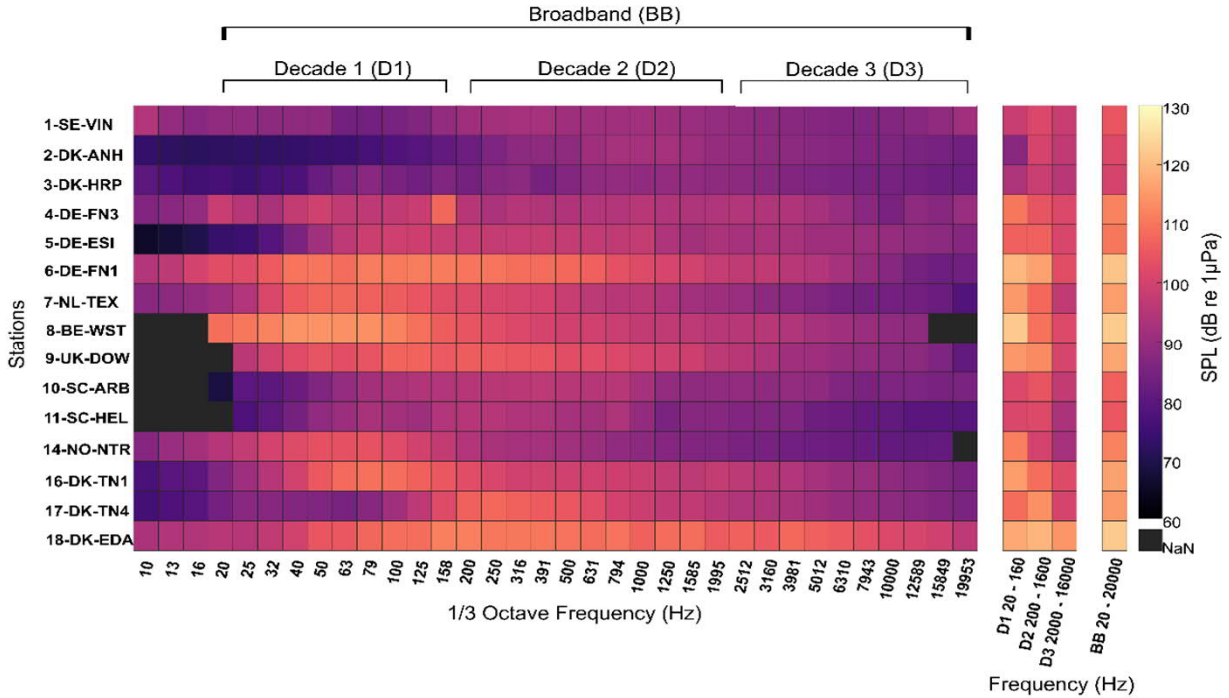
Measurements



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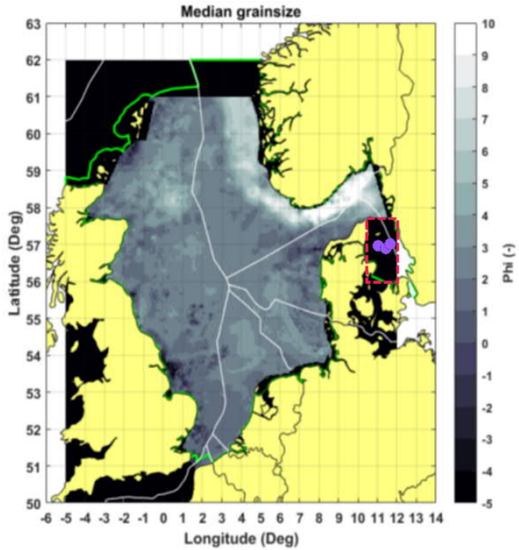
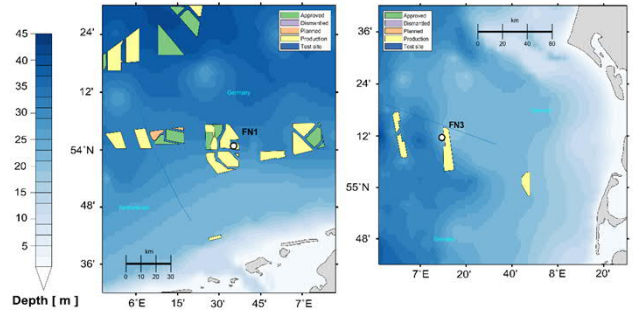
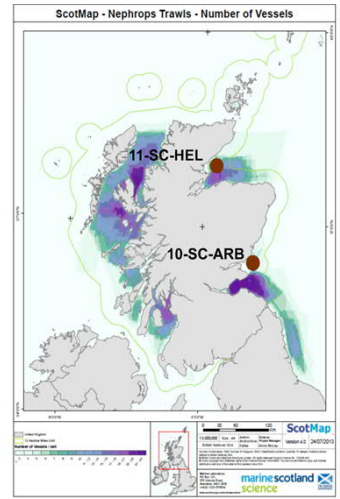
Station characteristics and possible sources of uncertainty

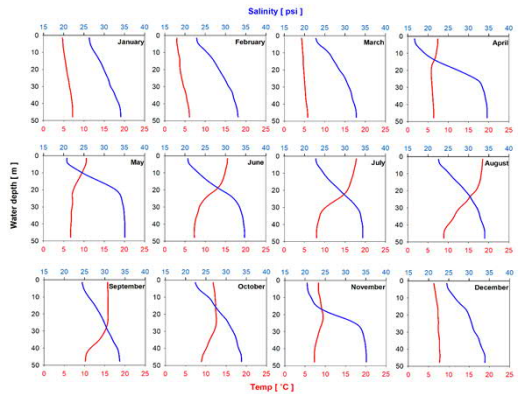
- Seasonal thermoclines
- Deep versus shallow sites
- Uncertainty in sediment type
- Flow noise
- Recreational fishing pressure
- Offshore wind farms
- Machinery/ generator noise
- Seismic surveys







Scotmap 2014



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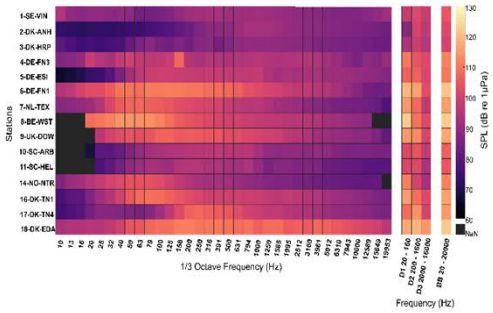
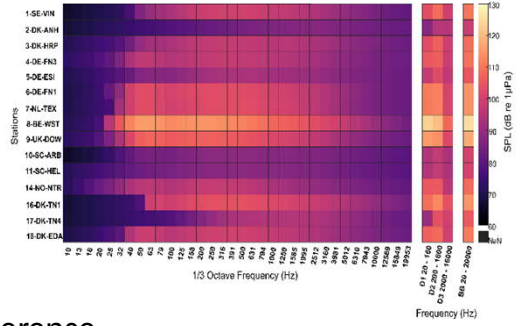
Comparison

Measurements



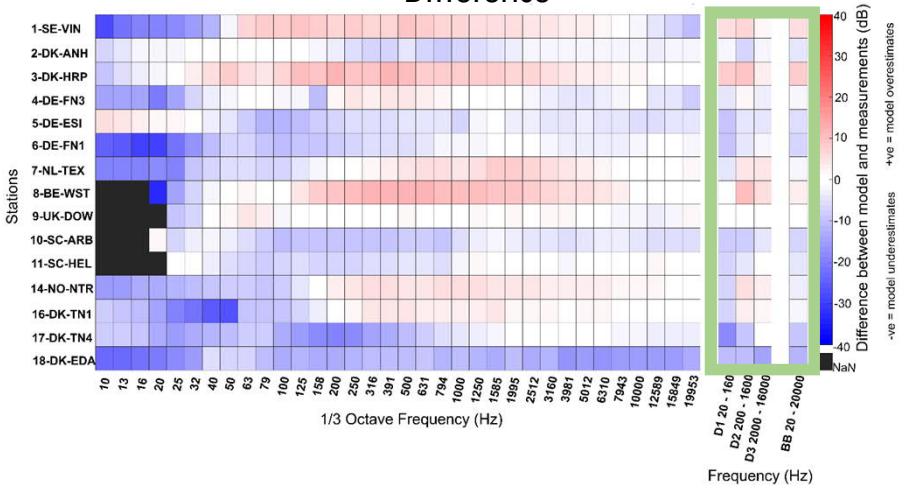
Model



2019 median difference heatmap produced for all third octaves, decadal and broadband frequencies

Blue = model lower than measurements
Red = model higher than measurements

Difference



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JOMOPANS Station	P50 Model – P50 Measurement difference [dB]			
	20 – 160 Hz	200 – 1600 Hz	2000 – 16000 Hz	20 – 20000 Hz
01-SE-VIN	5.2	7.0	1.4	5.4
02-DK-ANH	-1.6	-6.4	-2.1	-4.6
03-DK-HRF	8.1	9.1	3.7	7.7
04-DE-FN3	-4.4	2.4	-4.3	-2.1
05-DE-ES1	-9.2	-4.6	-4.0	-6.0
06-DE-FN1	-9.1	-4.9	-2.1	-7.3
07-NL-TEX	-5.0	3.8	4.0	-1.7
08-BE-WST	1.2	11.2	5.8	2.8
09-UK-DOW	0.5	0.7	1.0	0.6
10-SC-ARB	-8.4	-7.6	-4.5	-7.3
11-SC-HEL	-6.5	-4.1	-0.1	-4.5
14-NO-NTR	-6.4	5.0	3.1	-3.4
16-DK-TN1	-7.0	3.5	1.5	-2.3
17-DK-TN4	-18.1	-9.8	-0.8	-9.6
18-DK-EDA	-11.1	-11.1	-14.8	-11.6

Proximity to an oil rig

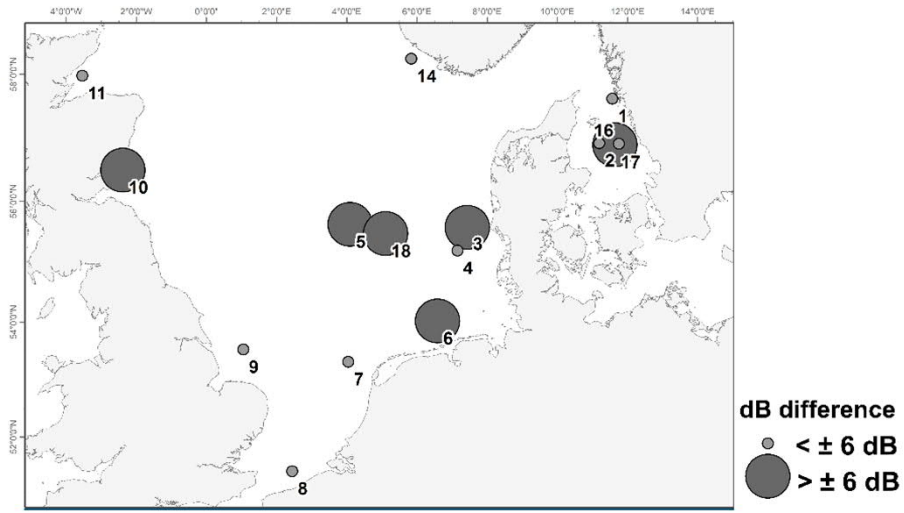
Generator at platform

Offshore wind farm noise

Non AIS fishing vessels

Sediment uncertainty in the Kattegat

Seismic survey/ proximity to oil rig



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WP6 Summary and Recommendations

- Greatest uncertainty at low frequencies < 2kHz
- Model closely agreed > 2 kHz (< 6 dB difference)
- Validation highlights difficulty in predicting shipping noise
  - Additional noise sources and environmental factors
  - Trade-off between model accuracy vs. model complexity

- More detailed analysis of individual ship passages to improve validation of ship noise model (BIG TASK)
- Further data treatment could separate intermittent and continuous sounds
- Consider sub regions of North Sea ('acoustic basins')
- Measurements essential to ground truth predictions and monitor trends

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Station characteristics and possible sources of uncertainty

	Continuous sound sources				Impulsive sound sources				Other sources			
Station	Shipping lane	No AIS ships	CTVs	Operational noise	Seismic surveys	Construction work	Sonar	Explosions	Flow noise	Mooring noise	Platform noise	Biological sound
01-SE-VIN	X	X							X			
02-DK-ANH		X	X	X	X		X		X	X		X
03-DK-HRF	X	X	X	X	X	X	X	X	X	X	X	X
04-DE-FN3			X								X	
05-DE-ES1					X					X		
06-DE-FN1	X		X	X		X	X		X		X	
07-NL-TEX	X								X	X		
08-BE-WST	X	X	X			X		X	X			X
09-UK-DOW	X								X			
10-SC-ARB		X			X				X	X		X
11-SC-HEL		X			X	X		X		X		X
14-NO-NTR												
16-DK-TN1	X	X	X	X	X		X		X	X		X
17-DK-TN4	X	X	X	X	X		X		X	X		X
18-DK-EDA		x	x	x	x	x	x	X	x	x	x	X

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