



XIII
INTERNATIONAL
WINTER ROAD
CONGRESS

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Québec 

SUSTAINABLE WINTER SERVICE FOR ROAD USERS

Developments in road weather forecasting

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Met Office



Developments in road weather forecasting - Route-Based Forecasting (RBF)

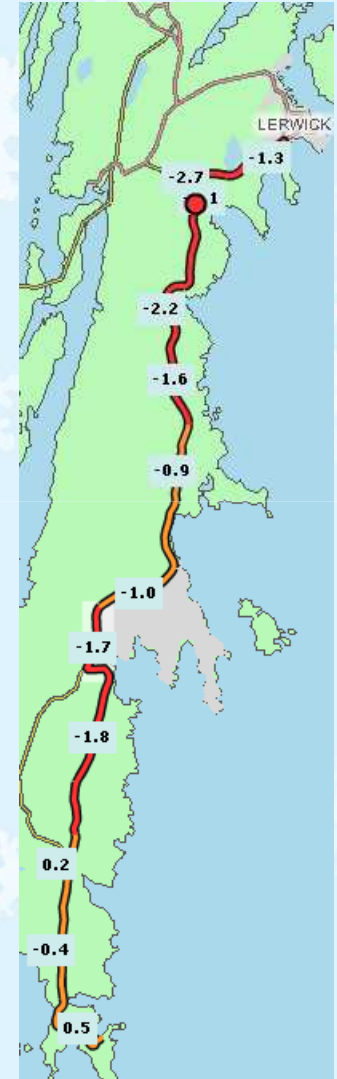
- Key features
- Current status of Met Office RBF system
- RBF Trials 2008-09 and 2009-10
 - Objectives
 - User feedback
 - Assessment
- Future developments and challenges



Developments in road weather forecasting – Route-Based Forecasting (RBF)

RBF – key features and benefits

- Provides “site specific” forecasts for several points along a route so that we can capture important variations and local detail
- Provides forecast of RST, road state and precipitation type along a route in one hourly time steps for up to 36 hours ahead
- Allows prioritisation of routes and helps to improve operational efficiency (route optimisation)
- Ability to identify cold routes more easily
- Ability for frequent updates, when required by weather situation



Developments in road weather forecasting - Route-Based Forecasting (RBF)

Met Office RBF - Current Status

- Driven by UK model, resolution 4km
- Model run 4 times per day, RBF automatically updated
- Route segments of variable length
- Several modelling points within each segment

- 3rd winter of trials
- RBF being used for operational decision-making by two users (Transerv Scotland and Devon County Council)
- Plan for RBF to be fully operational winter 2010/11

Developments in road weather forecasting - Route-Based Forecasting (RBF)

RBF Trials – Current status

Number
of routes:
2007-08
18

2008-09
72

2009-10
91



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RBF Trials - Current Status

- Total number of points modelled for all routes:
2008/09 – 8937 2009/10 – 11598
- Total number of route segments in 2009/10 - 1749
- Total number of route kilometers modelled 2009/10 - 4759km
- Average segment length (2009/10) - 2.72 km.
- Longest segment (2009/10) - 14.44km
- Average distance between adjacent modelling points - 0.41km

Developments in road weather forecasting - Route-Based Forecasting (RBF)

RBF Trials – Objectives

To assess:

- Variable segmentation – does it work?
- Quality and clarity of visualisation scheme
- Accuracy of output (verification)
- Useability – how easy is it to use?

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RBF Trials Assessment - Variable segmentation

Segment length determined by changes in:

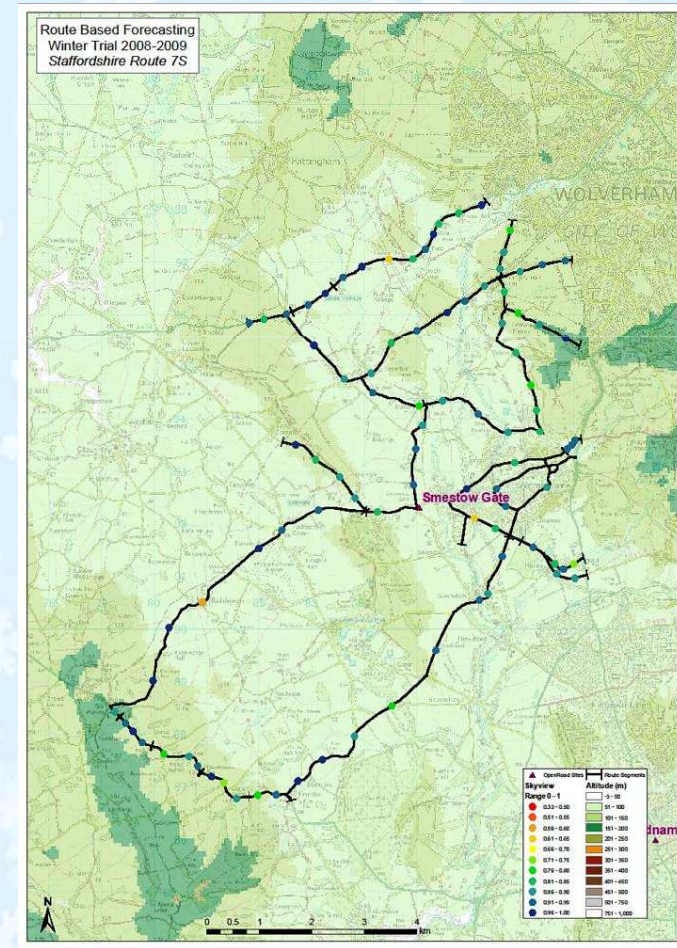
- Land use
- Altitude
- Road construction
- Sky view
- User's experience and route knowledge

Assessed by:

Car surveys (2008/09), User feedback

Conclusion:

Variable segmentation gives better representation of weather variability along a route than fixed segmentation

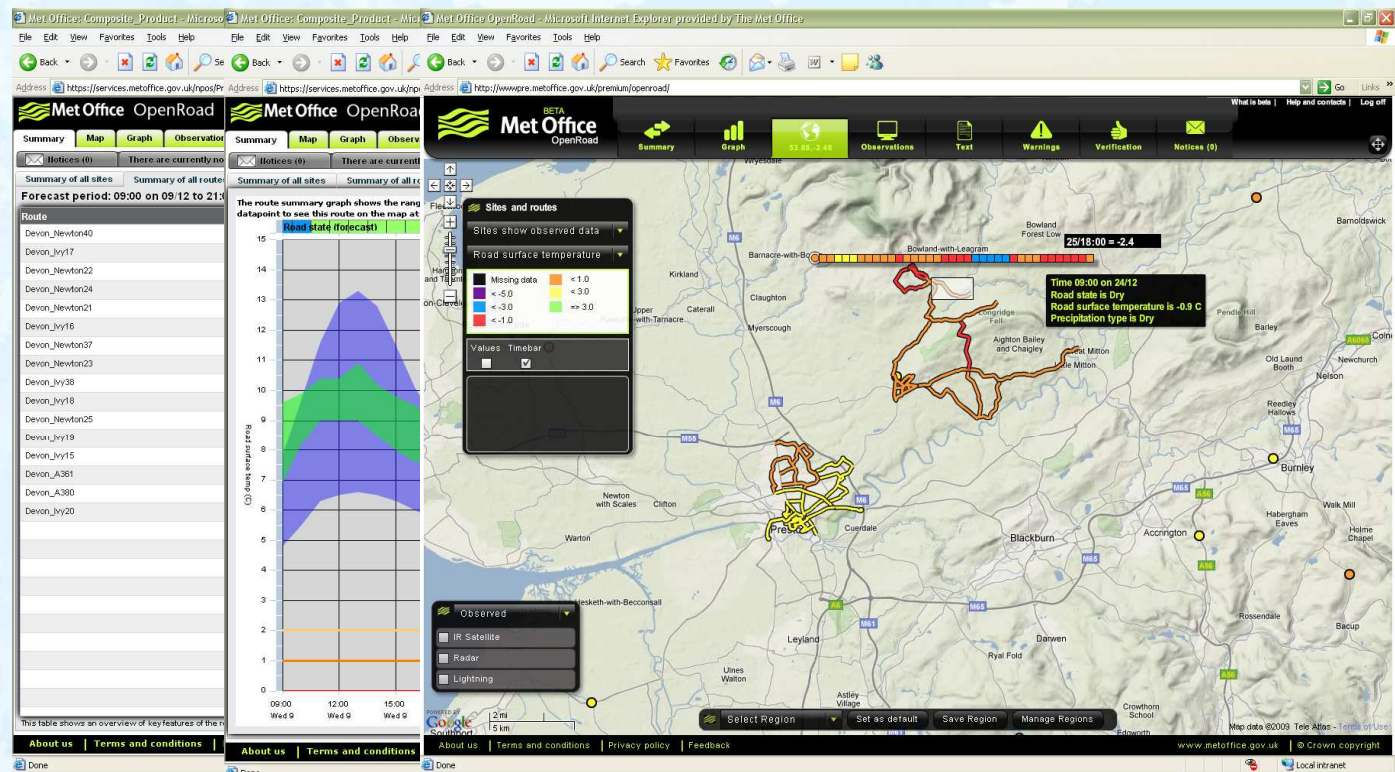


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RBF Trials Assessment - Visualisation

User feedback - three options available to view route information:

- Summary list of all routes
- Summary graph of each route
- Ability to view route information on a map



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RBF Trials Assessment - Accuracy

Verification of RBF is difficult (challenging).....!

Option 1:
Site vs Route
Segment



Option 2:
Subjective comparison - users compare potential actions using RBF with actions taken using standard area forecast

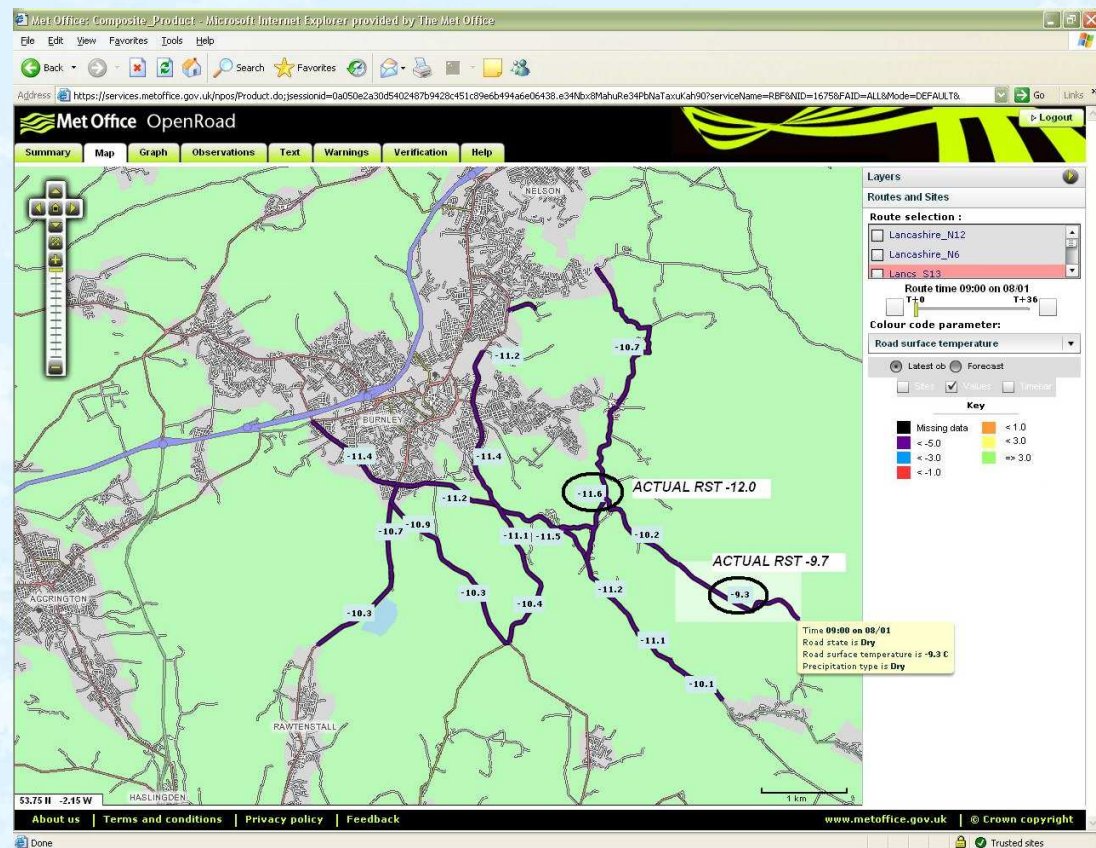
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W		
1	Comparison of OpenRoad and Route Based Forecasting																								
2	Date	Decision		Route Based Forecast RST on the First Forecast and "Shadow Action"																				Abortive	
3					LOW LEVEL ROUTES BELOW 150 m AOD										HIGH LEVEL ROUTES OVER 150 m AOD										
4		Actual	Actual	Actual at Dewsbury	Forecast Open Road at Dewsbury	Low Routes Average	Route 2	Route 5	Route 7	Route 8	Route 9	Route 18	Grit below 150m AOD	Actual at W'Moor	Forecast Open Road at W'Moor	High Routes Average	Route 21	Route 26	Route 28	Route 29	Route 30	Route 33	Met Office - Yes		
78	12-Dec-09	Yes		2.2	-0.5	-0.2	-0.4	-0.8	-0.1	0.2	0	0.2	Yes	0.4	-1.7	-0.1	-0.2	-0.6	-0.3	-0.1	0.2	0.2	Yes		
79	13-Dec-09		No	3.6	2	0.4	0.2	0.7	0.2	0.4	0.3	0.4	No	1	1	0.1	-0.1	0.2	0.5	0.1	-0.2	-0.2			
80	14-Dec-09			4.8	4.6									2.2	1.6										
81	15-Dec-09			3.2	2.9	4.3	4.4	3.4	4.5	4.6	4.6	4.4		1.6	0.6	2.5	1.9	1.7	3	2.3	2.7	3.6			
82	16-Dec-09			2.2	-0.7	2.9	2.8	2.2	3.1	3.1	3.3	2.9	Yes	-0.8	-2.3	1.4	1	1.2	1.8	1.2	1.4	1.7			
83	17-Dec-09					-0.5	-0.8	-0.7	-0.3	-0.3	-0.3	-0.8	Yes			-2.0	-2.4	-2.2	-1.9	-1.7	-2.1	-1.8			
84	18-Dec-09					-4.3	-4.4	-4.5	-4.2	-4.4	-4	-4	Yes			-5.8	-6.4	-5.8	-5.4	-5.4	-5.9	-5.7			
85	19-Dec-09					-8.2	-8.4	-8.4	-8	-7.7	-8	-8.5				-9.1	-9.3	-9	-8.7	-9.8	-8.9	-8.7			
86	20-Dec-09																								
87	21-Dec-09																								

Developments in road weather forecasting - Route-Based Forecasting (RBF)

RBF Trials Assessment - Accuracy

Option 3: Car surveys

Eg. 8 Jan 2010: Cold air pooling in valley –
temperature difference
confirmed by survey

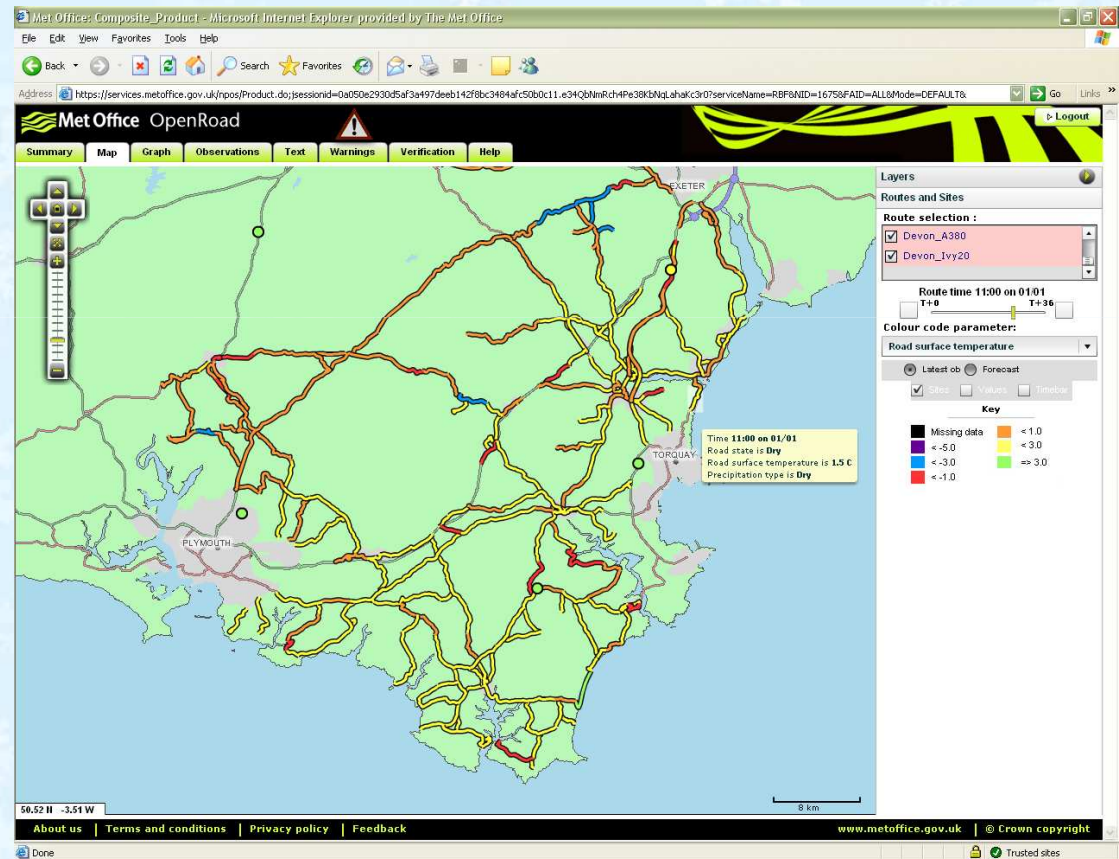


Developments in road weather forecasting - Route-Based Forecasting (RBF)

RBF Trials Assessment – Useability

User feedback:

- Grouping of multiple routes, user definable
 - by height, or
 - by depot, or
 - by climatic domain
- User definable thresholds
- Route summary on map
- Print options, archiving



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Future Developments

- Modelling Capability – move to 1.5km model resolution
- Technology – new web platform - improved performance and useability, more capacity – *imminent Winter 2009/10*
- Improved mapping used to display routes – *imminent Winter 2009/10*
- Further improvements to ancillary data

Future Challenges

- Multiple routes management
- Frequency of updated model output
- Conveying uncertainty in certain difficult weather situations (FIT)

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Thank You!

Any Questions?

