

# Small mesoscale features during bora at Dubrovnik airport

Jadran Jurković, Lada Gabela Šeperić, Igor Kos,  
Branko Grisogono, Željko Večenaj



# Outline

Introduction

Measurements

Bora

Examples lidar profile

Conclusion

# Measurements

- Lidar (poster)
  - SESAR 2020 programme
  - first lidar observation in Croatia
    - (not bora)
- winter 2017/2018



The poster is titled 'First LIDAR Measurements in Croatia' and is a joint effort between Leosphere and Croatia Control. It is dated 'M16 - 2018'. The poster is divided into several sections:
 

- 1. Introduction:** Discusses the importance of Lidar in understanding the atmosphere and its role in the SESAR 2020 programme.
- 2. LIDAR Installation:** Shows a 3D map of the Dubrovnik area with the Lidar station location marked, and a photograph of the physical Lidar unit.
- 3. Scanning Scenarios and Examples:** Displays various Lidar scan patterns (vertical, horizontal, wind mode) and corresponding data visualizations (range, wind speed, etc.).
- 4. Bora Episodes During LIDAR Measurements:** A table listing specific measurement dates and times during Bora episodes.
- 5. Next Steps:** Outlines the future use of the data for SESAR 2020 projects and research.

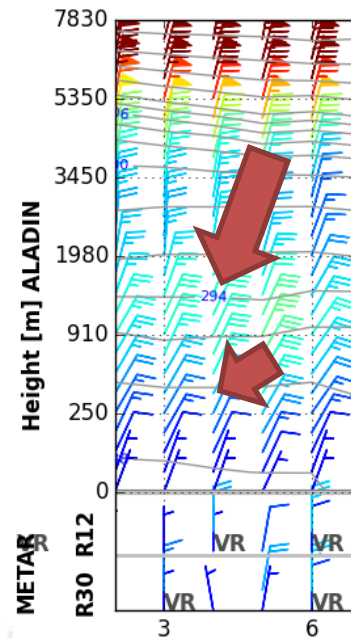
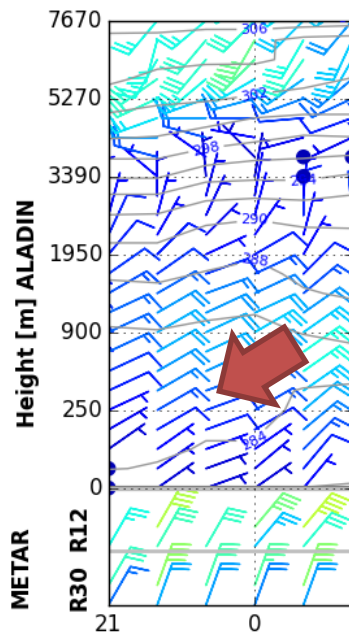
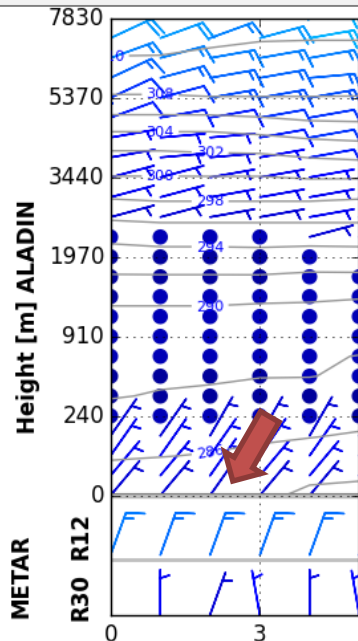


# Bora classification - profile

Nocturnal gap flow  
*burin*

Bora

Deep bora



TAF

02018KT

02025G38KT  
TEMPO 02035G50KT

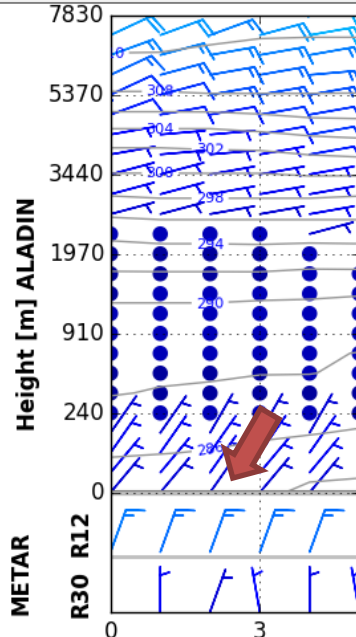
36012KT  
TEMPO VRB15G40KT

# Bora classification - profile

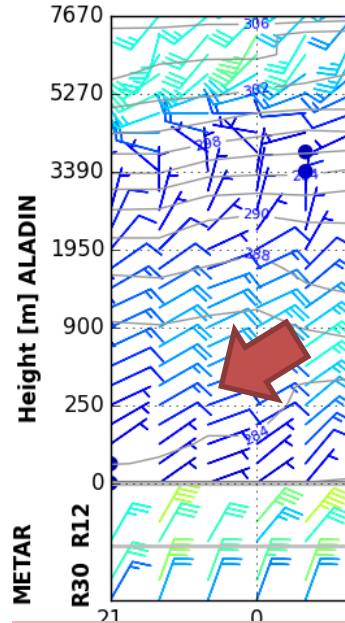
Nocturnal gap flow  
*burin*

Bora

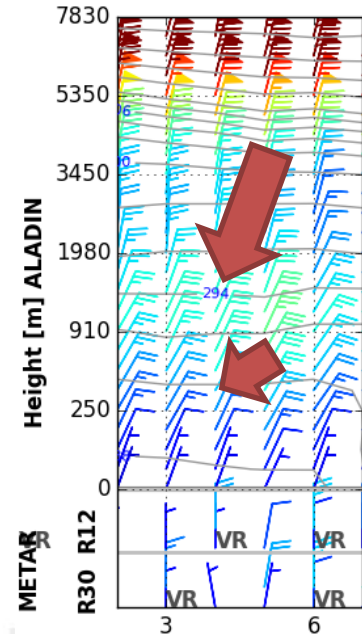
Deep bora



Minor



Occasionally reduces  
operations



Potentially  
hazardous

IMPACT  
to traffic



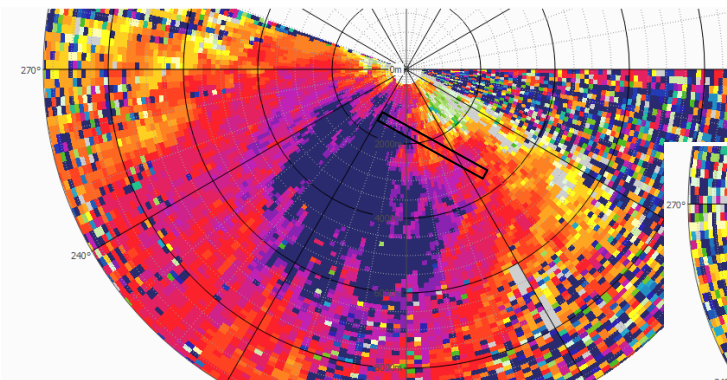
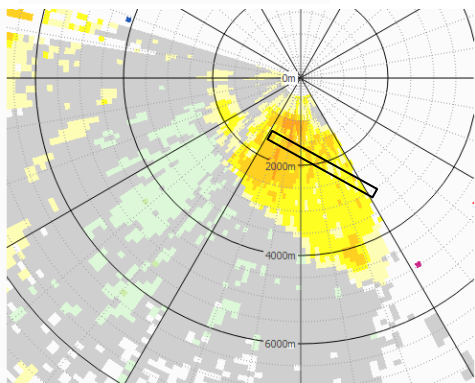
# Bora classification - PPIO

Nocturnal gap flow  
*burin*

Bora

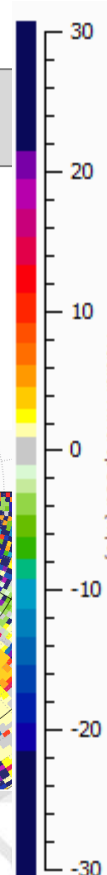
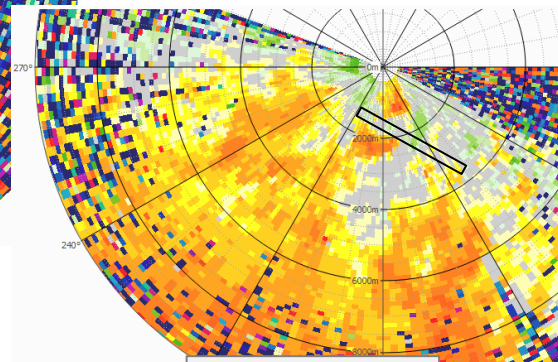
Deep bora

2017-12-20 02:36:51.404



2018-01-21 19:53:27.651

2018-01-22 12:52:09.181



**OBS**

CROATIA  
CONTROL

02020KT  
**02015KT**  
03014KT

04026G51KT  
**02034G56KT**  
02023G59KT

VRB10G20KT  
**VRB08G20KT**  
VRB05KT  
04016G36KT



# Nocturnal gap flow PPI0

**2017-12-20 01:06:07.812**

System ID: WLS400s-113

Latitude:

Longitude:

Accumulation time: 500 ms

Range gate length: 200 m

Rotation speed: 3 °/s

Elevation: 0.000 °

Scan ID: 53

Resolution ID: 7

220030Z 04014KT

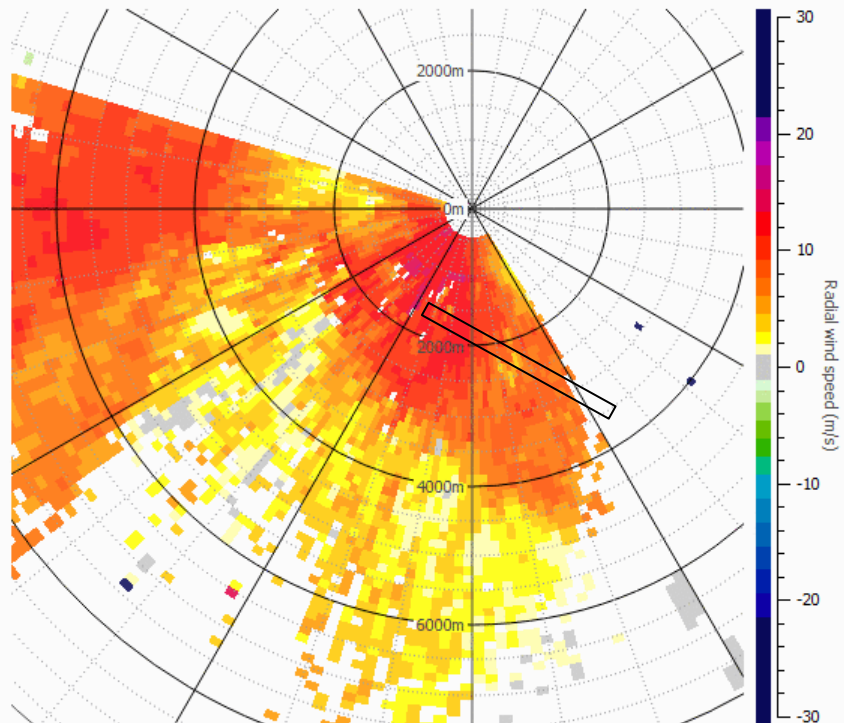
220100Z 03018KT

220130Z 03018KT

220200Z 04012KT

220230Z 04011KT

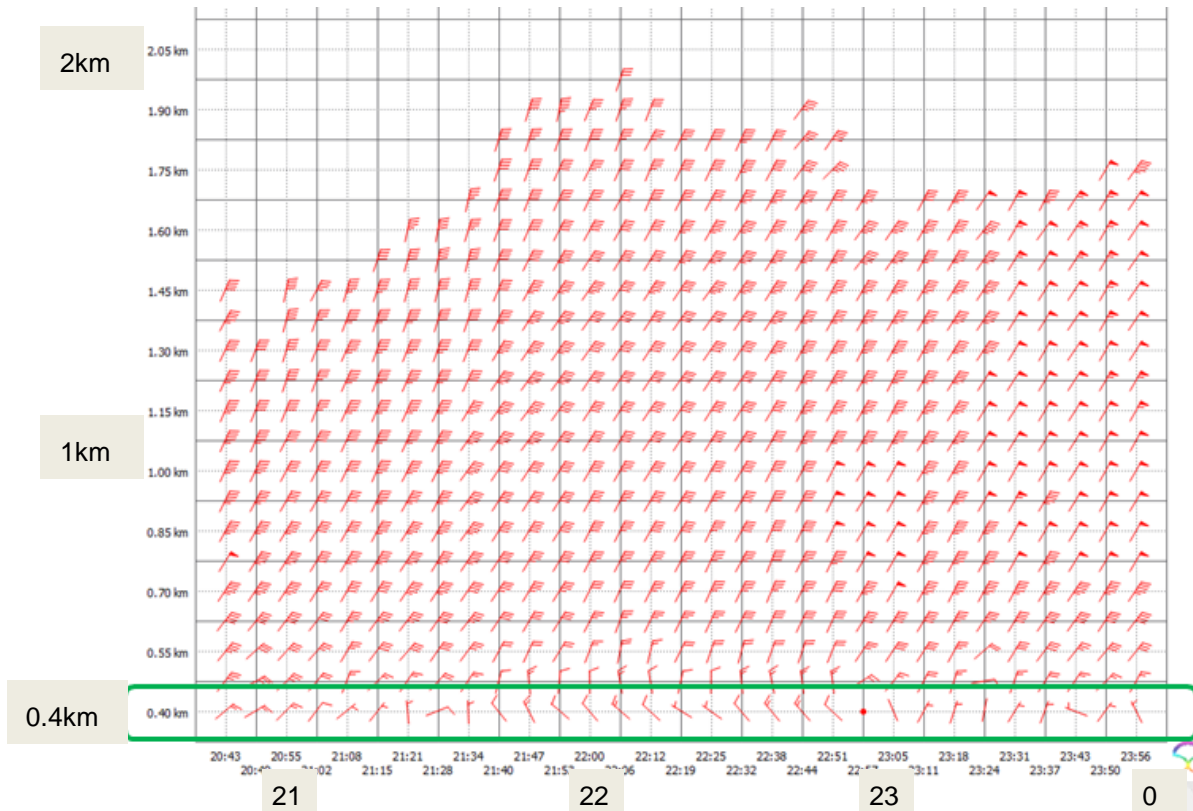
220300Z 03016KT





# Bora

**LIDAR  
Selex**



Info

VADP (V)  
23:56 / 21-Jan-2018  
Dubrovnik Lidar  
Pdf File: 30deg.vadp  
Range: 7 km  
Elevation:30.0 deg

Rainbow® Selex ES GmbH

21	22	23	0
02023G59KT	01023G39KT	01023G51KT	34015G29KT
		VRB11KT	
		VRB14G34KT	
		VRB19G46KT	
		VRB14G34KT	



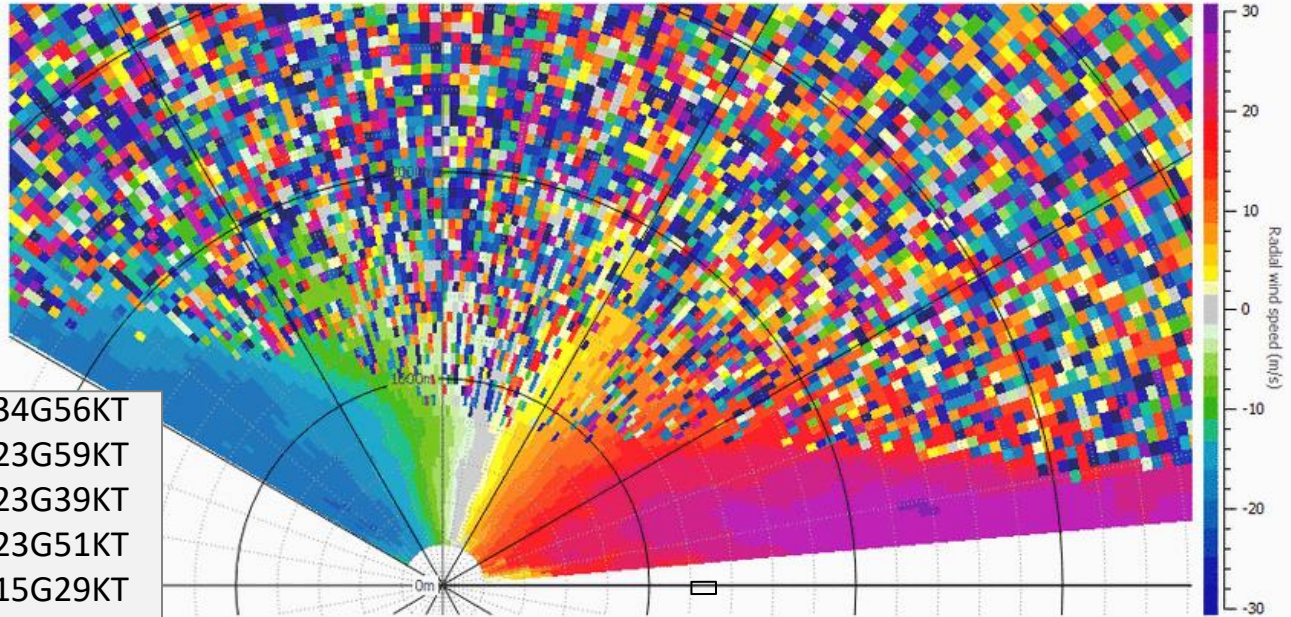


# Standard bora RHI

2018-01-21 20:30:54.858

System ID: WLS400s-113  
Latitude:  
Longitude:  
Accumulation time: 180 ms  
Range gate length: 100 m  
Rotation speed: 6 °/s  
Azimuth: 210.000 °  
Scan ID: 109  
Resolution ID: 10

2000Z 02034G56KT  
2030Z 02023G59KT  
2100Z 01023G39KT  
2130Z 01023G51KT  
2200Z 34015G29KT  
2230Z VRB11KT  
2300Z VRB14G34KT  
2330Z VRB19G46KT  
0000Z VRB14G34KT



# Standard bora PPI0

2018-01-21 19:02:12.791

System ID: WLS400s-113

Latitude:

Longitude:

Accumulation time: 500 ms

Range gate length: 200 m

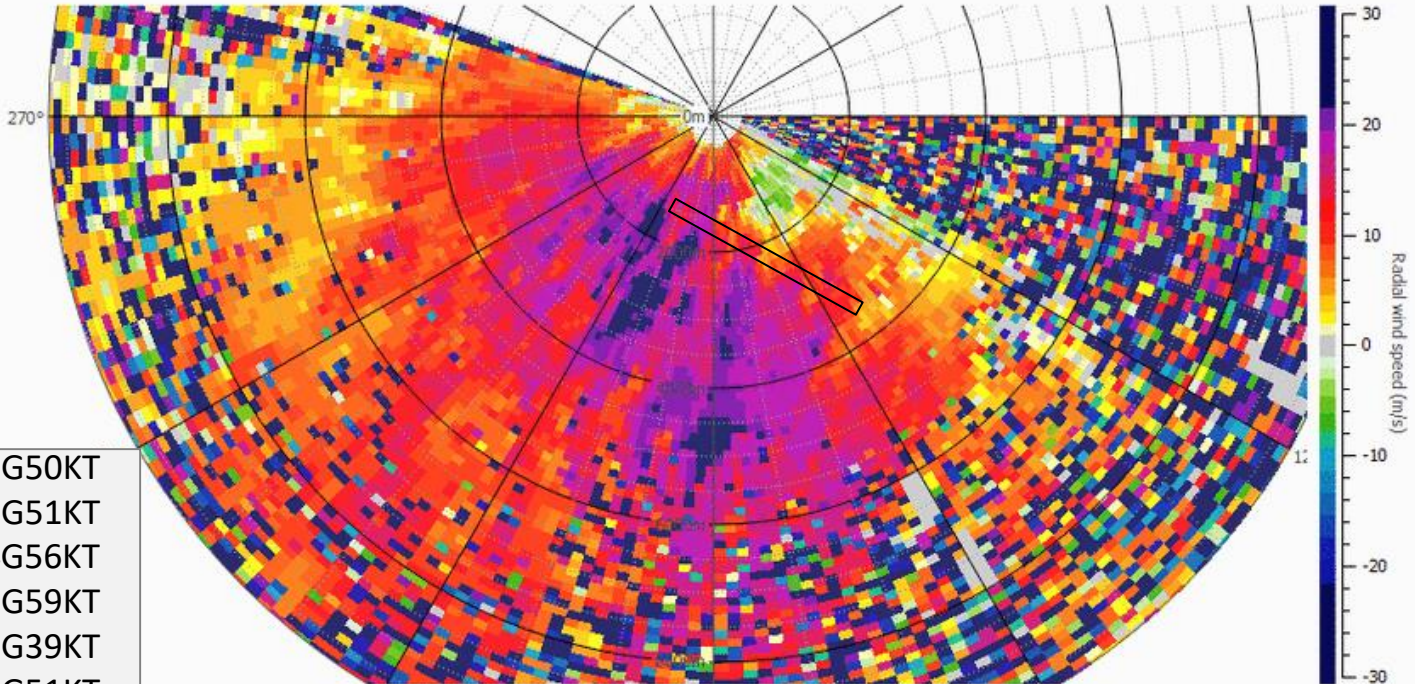
Rotation speed: 3 °/s

Elevation: 0.000 °

Scan ID: 89

Resolution ID: 7

```
211900Z 01028G50KT
211930Z 04026G51KT
212000Z 02034G56KT
212030Z 02023G59KT
212100Z 01023G39KT
212130Z 01023G51KT
212200Z 34015G29KT
```



# Deep bora RHI

**2018-01-22 12:06:34.382**

System ID: WLS400s-113

Latitude:

Longitude:

Accumulation time: 180 ms

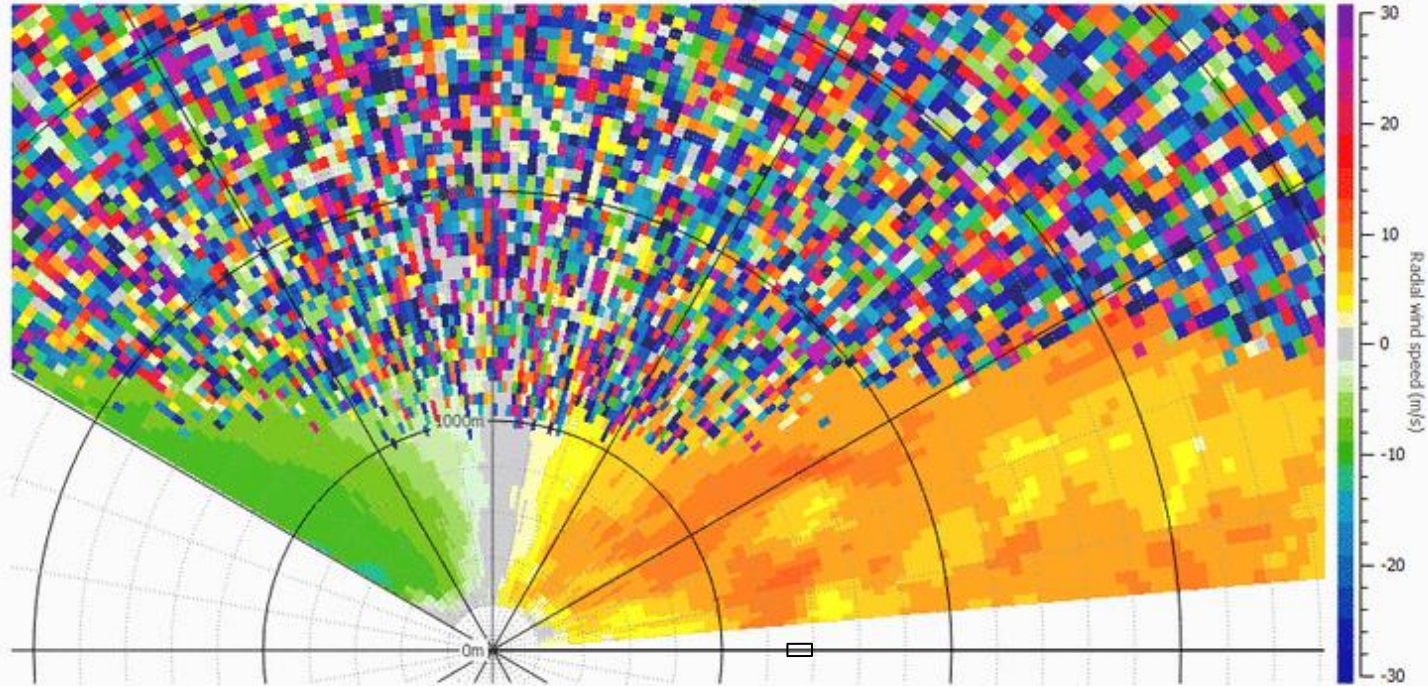
Range gate length: 100 m

Rotation speed: 6 °/s

Azimuth: 210.000 °

Scan ID: 109

Resolution ID: 10





# Deep bora PPI

**2018-01-22 12:07:36.976**

System ID: WLS400s-113

Latitude:

Longitude:

Accumulation time: 500 ms

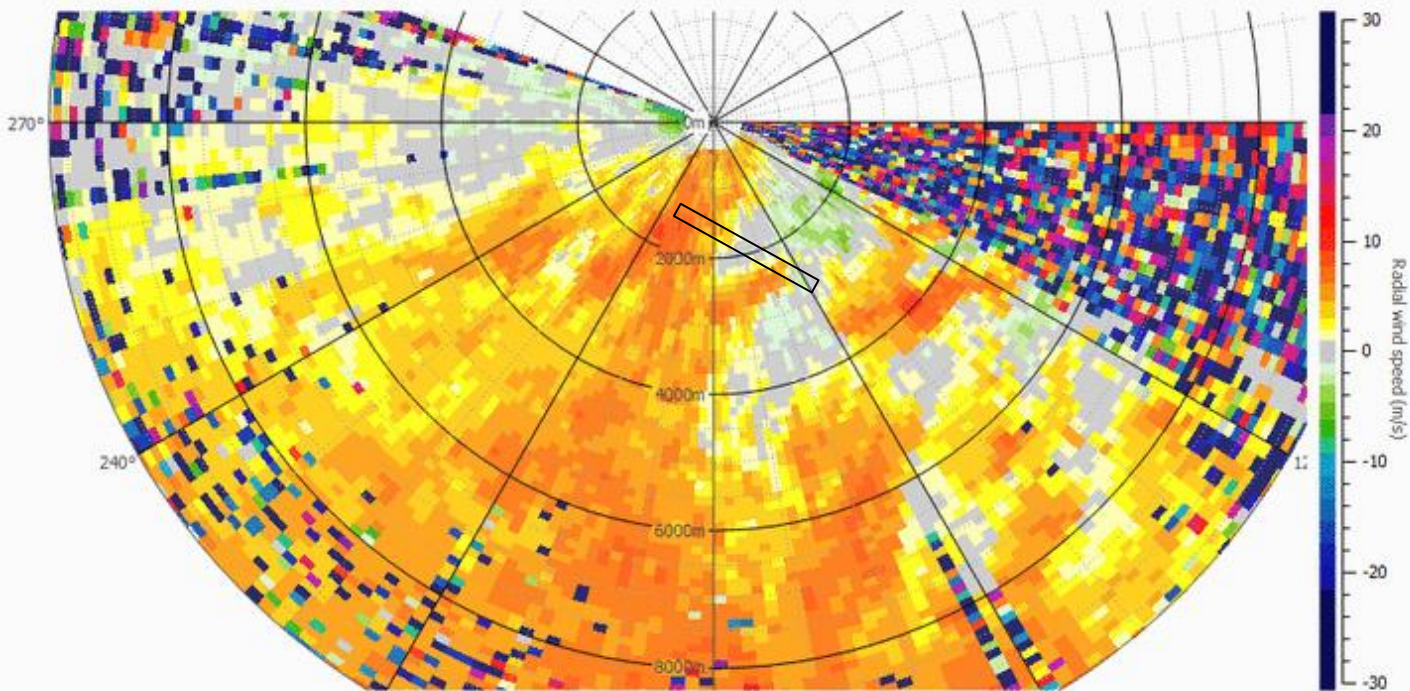
Range gate length: 200 m

Rotation speed: 3 °/s

Elevation: 0.000 °

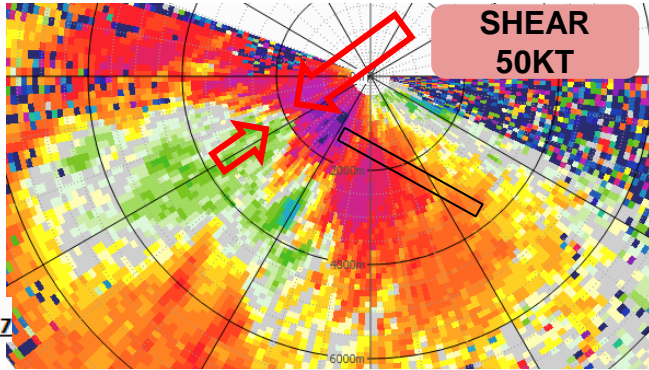
Scan ID: 89

Resolution ID: 7



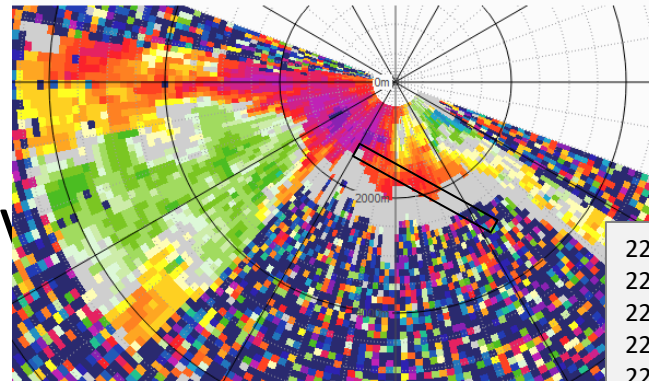
# Deep bora -extreme

PPI 0°  
210°



2018-01-22 14:40:47

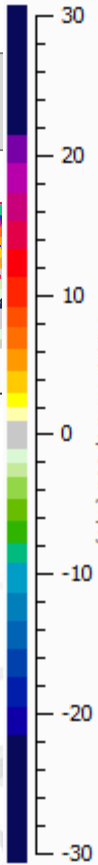
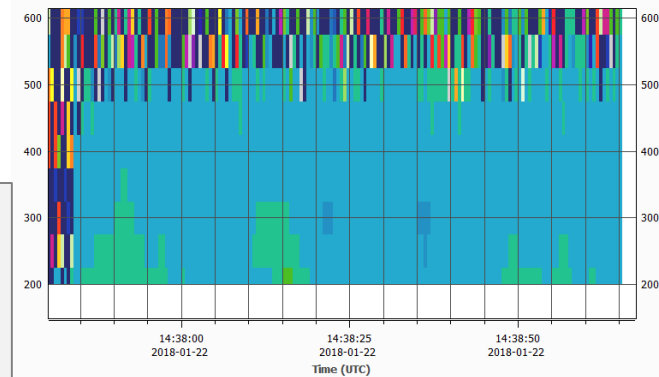
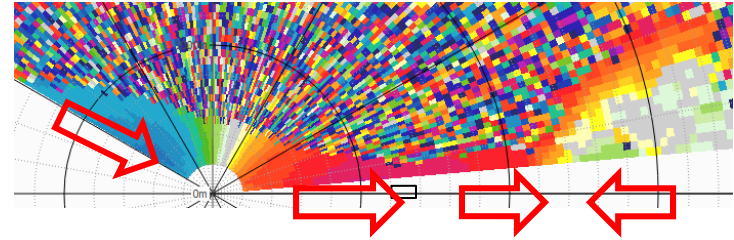
PPI -2°



-5 - -8m/s

221330Z VRB05KT  
221400Z 04016G36KT  
221430Z **04030G45KT**  
221500Z VRB21G38KT  
221530Z VRB10G21KT  
221600Z 35009KT

Deep bora  
RHI





Dubrovnik

LIDAR