



Do zooplankton react to solar eclipses?

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Solar eclipse of 20 March 2015

- Upward looking AZFP moored at 84 m in Kongsfjorden?
- 3 frequencies: 125, 200, and 455 kHz
- 3 days of data - from 12:00 on 18 March to 12:00 on 21 March 2015

Objective of Study:

1) Verify the reaction of zooplankton to a complete solar eclipse

Zaćmienie Słońca, 20.03.2015 - Polska Stacja Polarna - Hornsund, Spitsbergen - 77°00' N 15°33' E



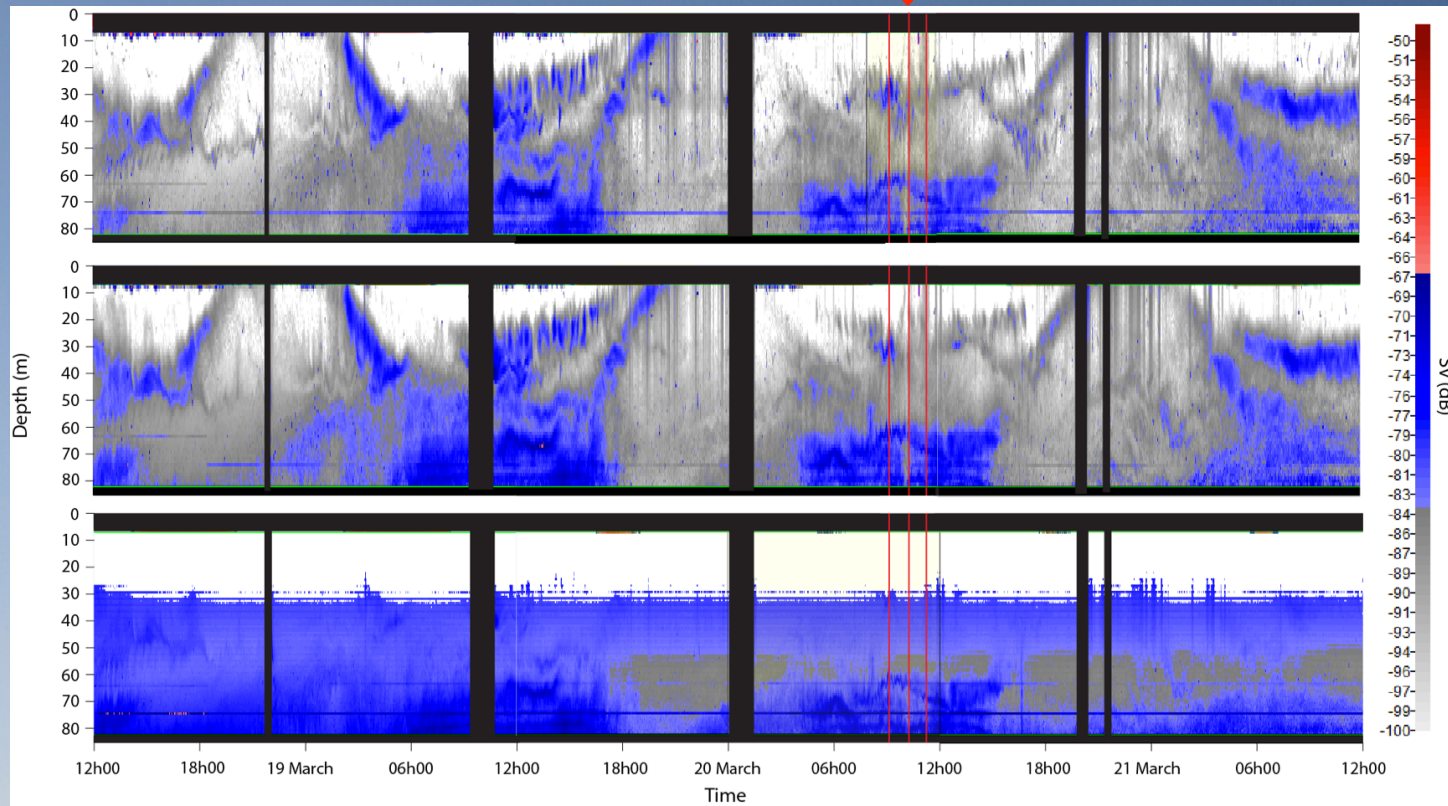
Results



125 kHz

200 kHz

455 kHz



- Noise (ringing?) at 455 kHz
- Noise at midday on 19 March
- Lower backscatter on 20 March

Results

- Stronger backscatter at 200 KHz:
Mix of copepods and euphausiids
- Stronger reaction at 125 and 200 kHz: larger organisms react more strongly

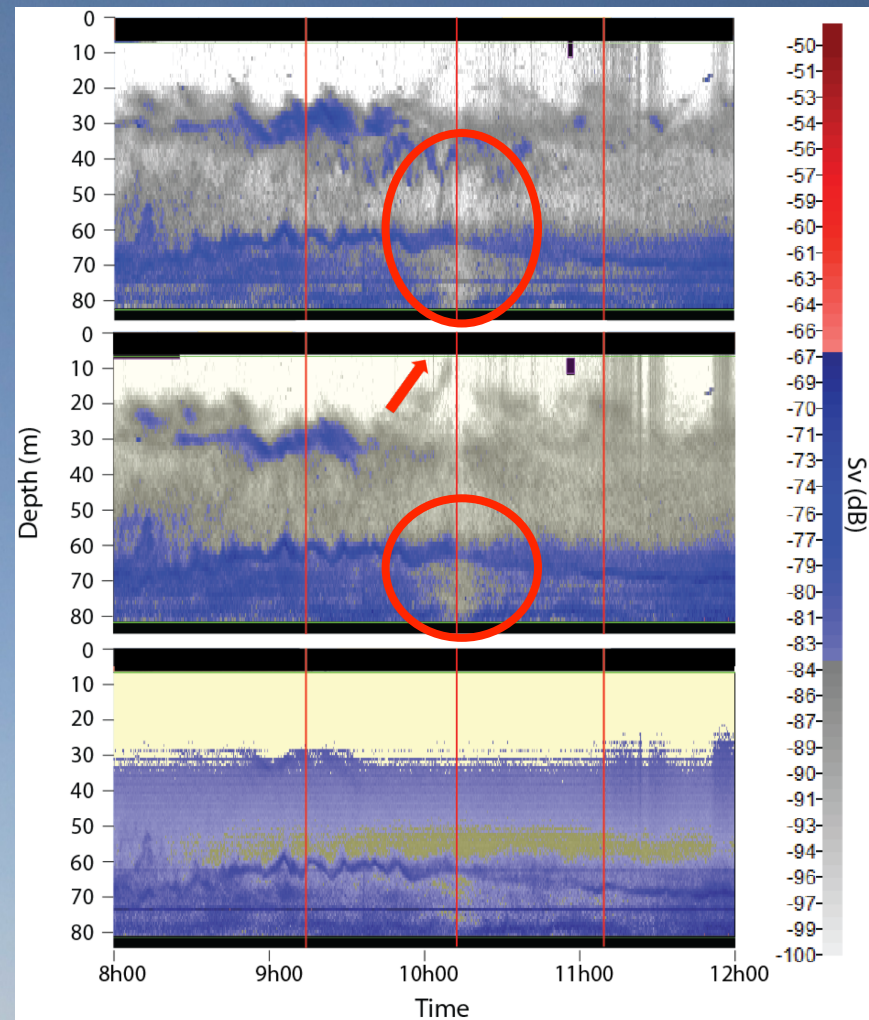


Figure 2. Volume backscattering strength at 125 kHz (top panel); 200 kHz (middle panel); and 455 kHz (bottom panel) from 8:00 to 12:00 on 20 March 2015. Bad pings and noise were removed from the echograms (black rectangles). The red lines indicate the beginning of the eclipse, the moment when the eclipse was total, and the end of the eclipse.

Results

- Backscatter from larger organisms increase in the top layer and decrease in intermediate and deeper layers.
- Backscatter in SL remain low, suggesting that most zooplankton react by descending more rapidly >80m.
- Back to normal after the eclipse.
- Puzzling increase in backscatter just before noon.

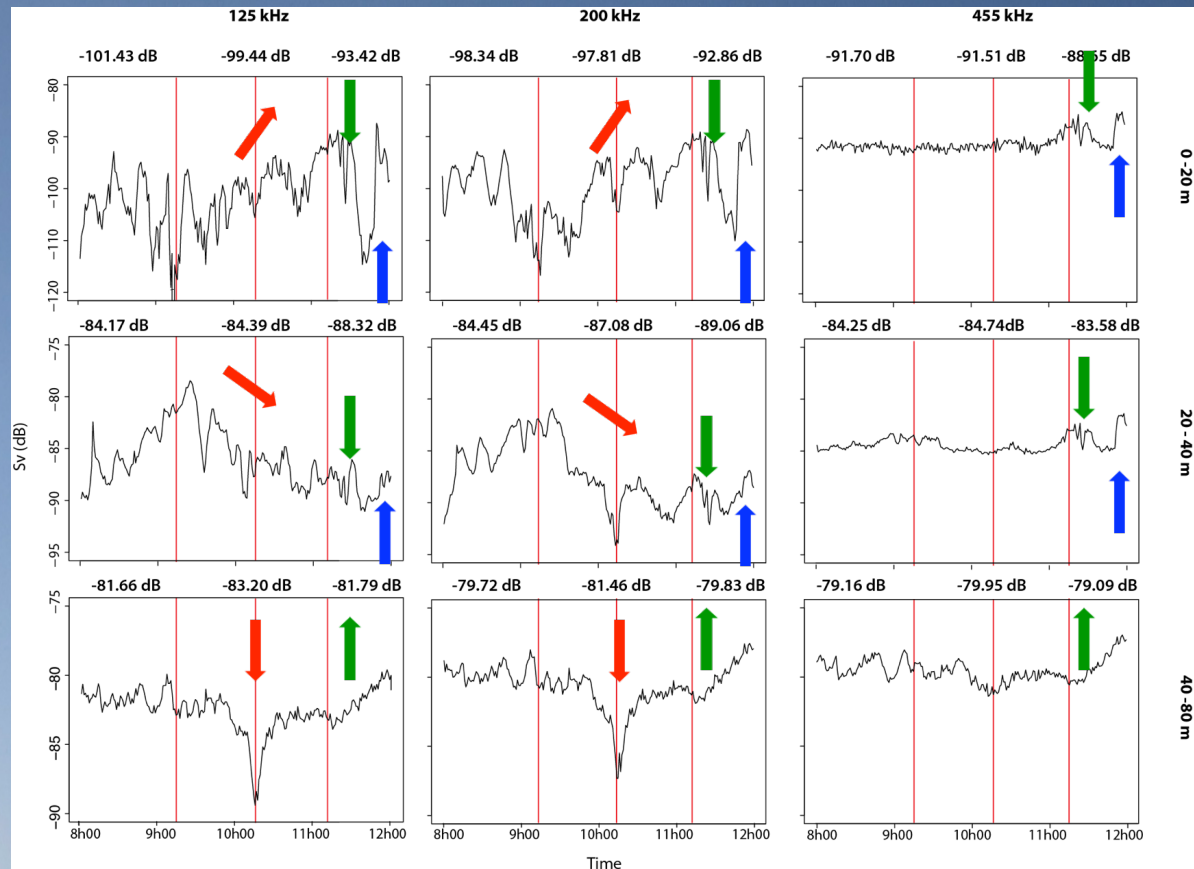


Figure 3. Plots of the mean volume backscattering strength against time in the top layer (0 - 20 m), the middle layer (20 - 40 m), and the deeper layer (40 - 80 m) at all three frequencies from 8:00 to 12:00 on 20 March 2015. The red lines indicate the beginning of the eclipse, the moment when the eclipse was total, and the end of the eclipse. Mean Sv values (calculated in the linear form) before, during, and after the time of the eclipse are indicated above each plot.

Results

- No such patterns on a normal day.

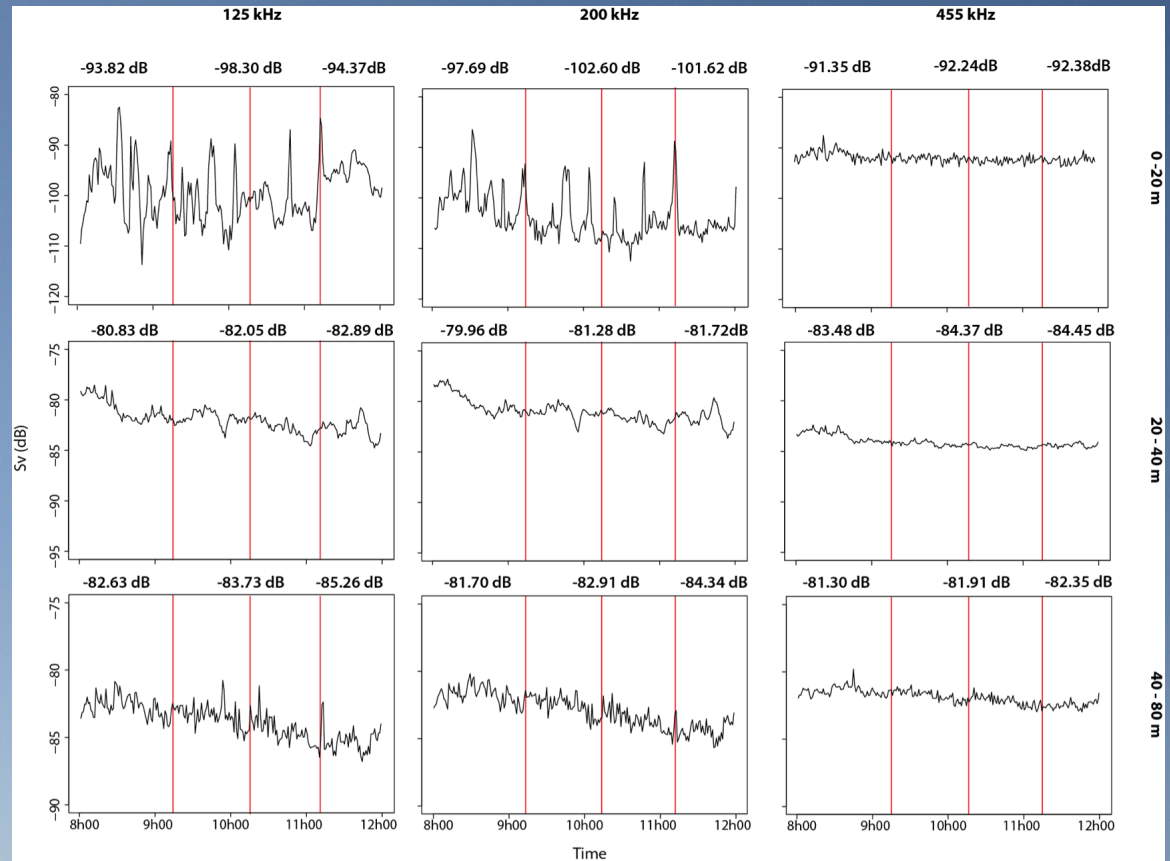


Figure 4. Plots of the mean volume backscattering strength against time in the top layer (0 - 20 m), the middle layer (20 - 40 m), and the deeper layer (40 - 80 m) at all three frequencies from 8:00 to 12:00 the day after the eclipse (21 March 2015). The red lines correspond to eclipse time the previous day. Mean Sv values (calculated in the linear form) before, during, and after the time corresponding to the eclipse are indicated above each plot.

What next?

- Statistical analyses
- Net data?
- Write the manuscript

Images: Hopcroft/UAF/NOAA

