

# Gravity Wave detection over the Jicamarca Radio Observatory using a Nightglow Allsky Imager: First results

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# Outline

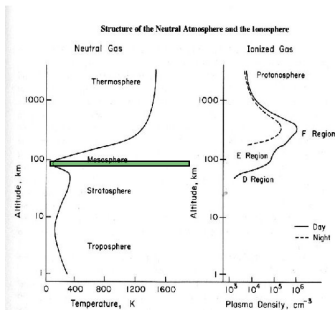
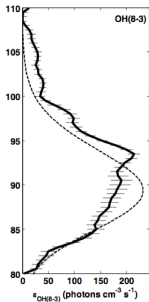
- 1 Motivation
- 2 GW detection method
- 3 Results
- 4 Summary

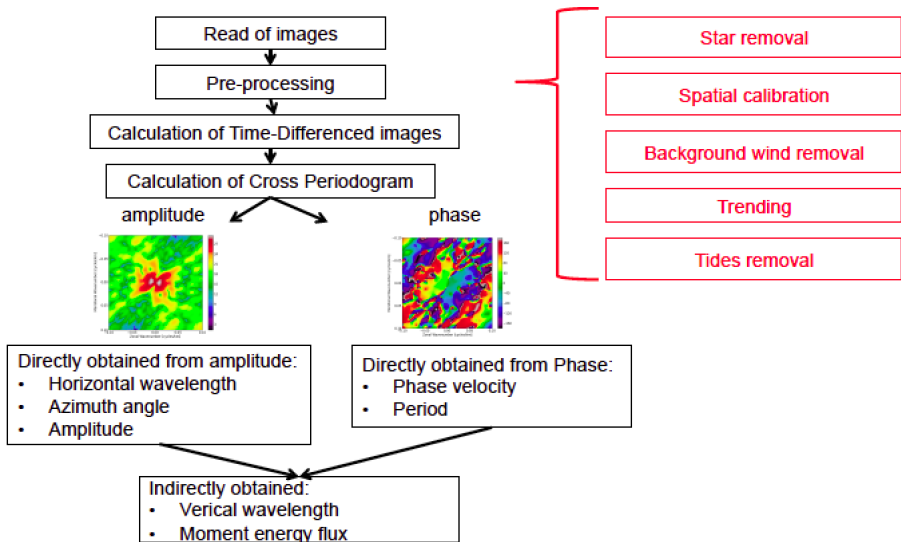
## Some science goals

- Gravity wave drag
- GW propagation and momentum flux

## Allsky Imager

- OH filter/ Meinel bands





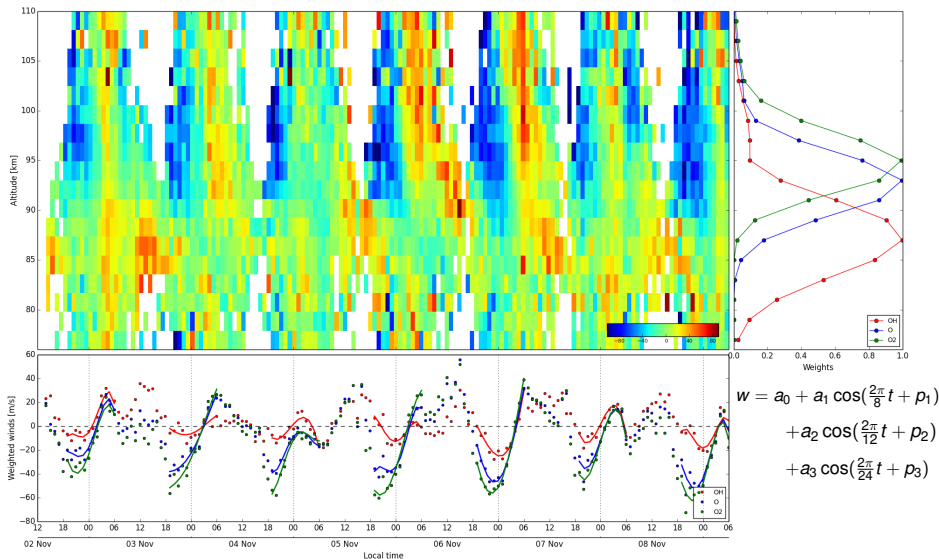
## Campaign August 2016

- Meteor radar + Allsky Imager
- From 11 Aug to 14 Aug (2 clear nights)

## Campaign November 2016

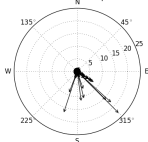
- Meteor radar + Allsky Imager
- From 02 Nov to 09 Nov (1 clear night)

# Meteor winds

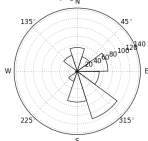
Zonal winds for OH, O, O<sub>2</sub> molecules

## Campaign results

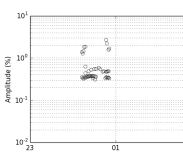
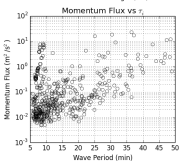
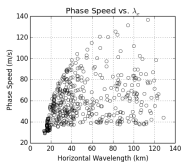
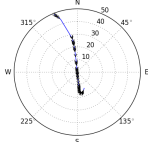
Momentum Flux vs. Prop. Direction



Wave Propagation Direction

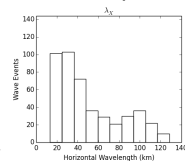
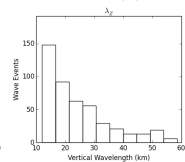
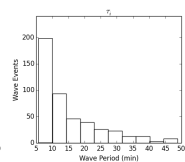
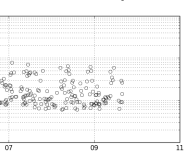
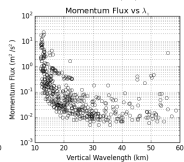
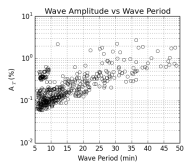
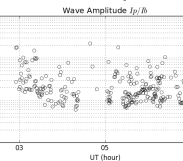
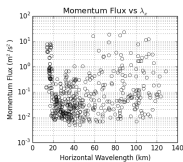


Horizontal Wind Direction

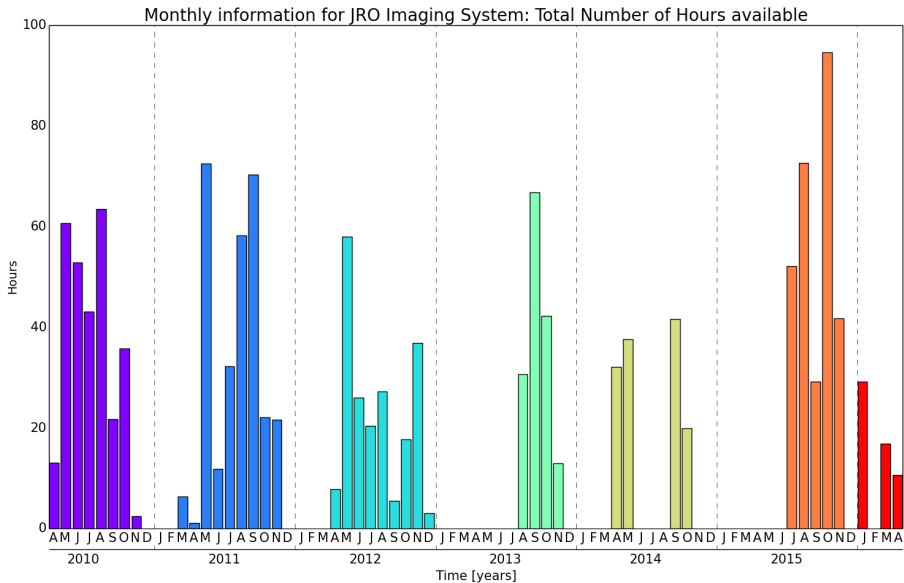


JASI 14 Aug 2015

$$\begin{aligned} \lambda_x &= 90 \pm 30 \text{ (km)} \\ \lambda_y &= 24 \pm 11 \text{ (km)} \\ \tau_y &= 14 \pm 9 \text{ (min)} \\ c_x &= 58 \pm 19 \text{ (m/s)} \\ F_{\text{max}} &= 0.30 \pm 1.47 \text{ (m}^2/\text{s}^2) \\ F_{\text{min}} &= -0.39 \pm 1.74 \text{ (m}^2/\text{s}^2) \end{aligned}$$

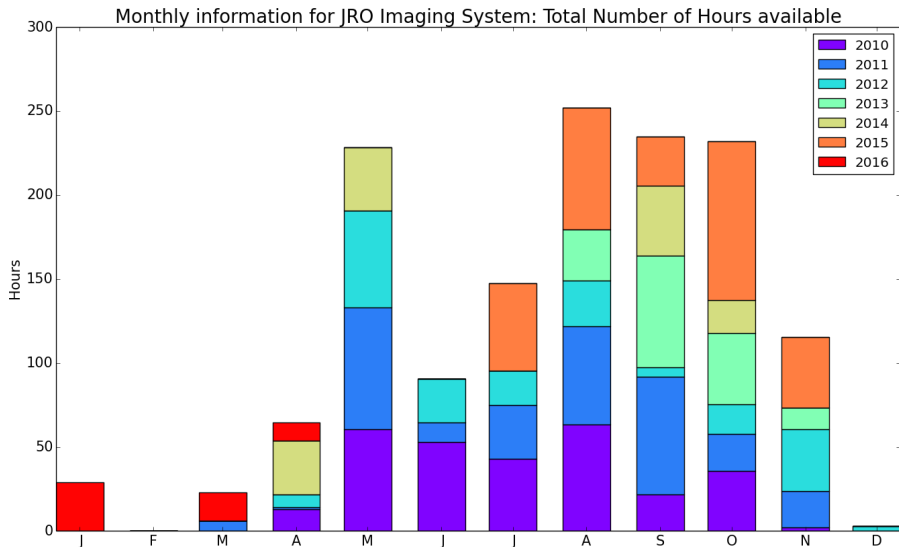


# Number of hours since 2010...

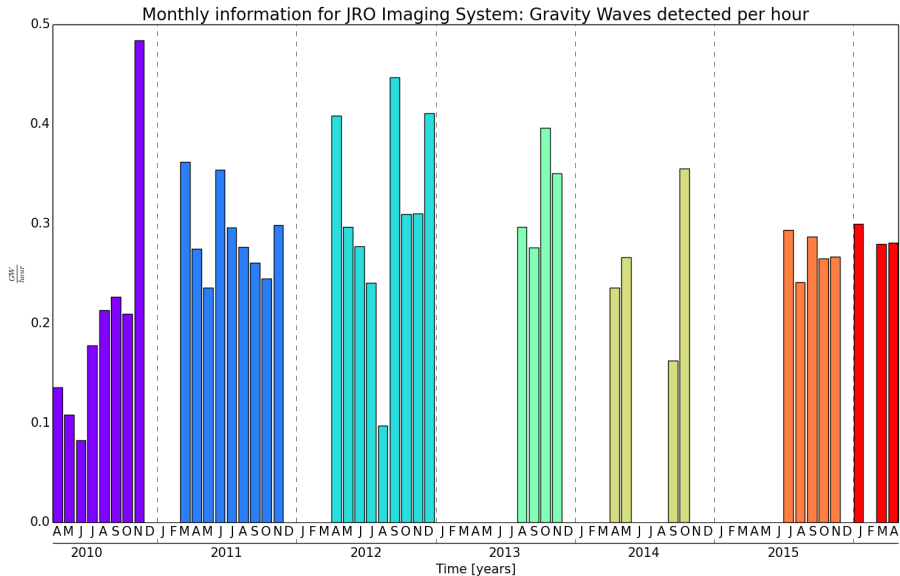




# Number of hours in composite year...



## GW/hour...



## Summary/Conclusion

- GW detection based on Spectral analysis [Tang et al 2005]
- Enough database to create a climatology on GW occurrence and direction of propagation.
- Coordinate more campaigns to study momentum flux.