

Nuffield Australia Farming Scholarships

Weather Forecasting & Business Management Systems

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2012 Nuffield Scholar

NUFFIELD
AUSTRALIA
FARMING SCHOLARS



GRDC
Grains
Research &
Development
Corporation
Your GRDC working with you.

THANK YOU





Where did I travel?

Global Focus

- India
- Qatar
- Ukraine
- Turkey
- France
- USA

Personal Study

- Netherlands
- England
- Ireland
- Canada
- USA
- Argentina
- New Zealand
- Fiji





European
Centre for
Medium-Range
Weather
Forecasts



FITZROY ROAD

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GRDC

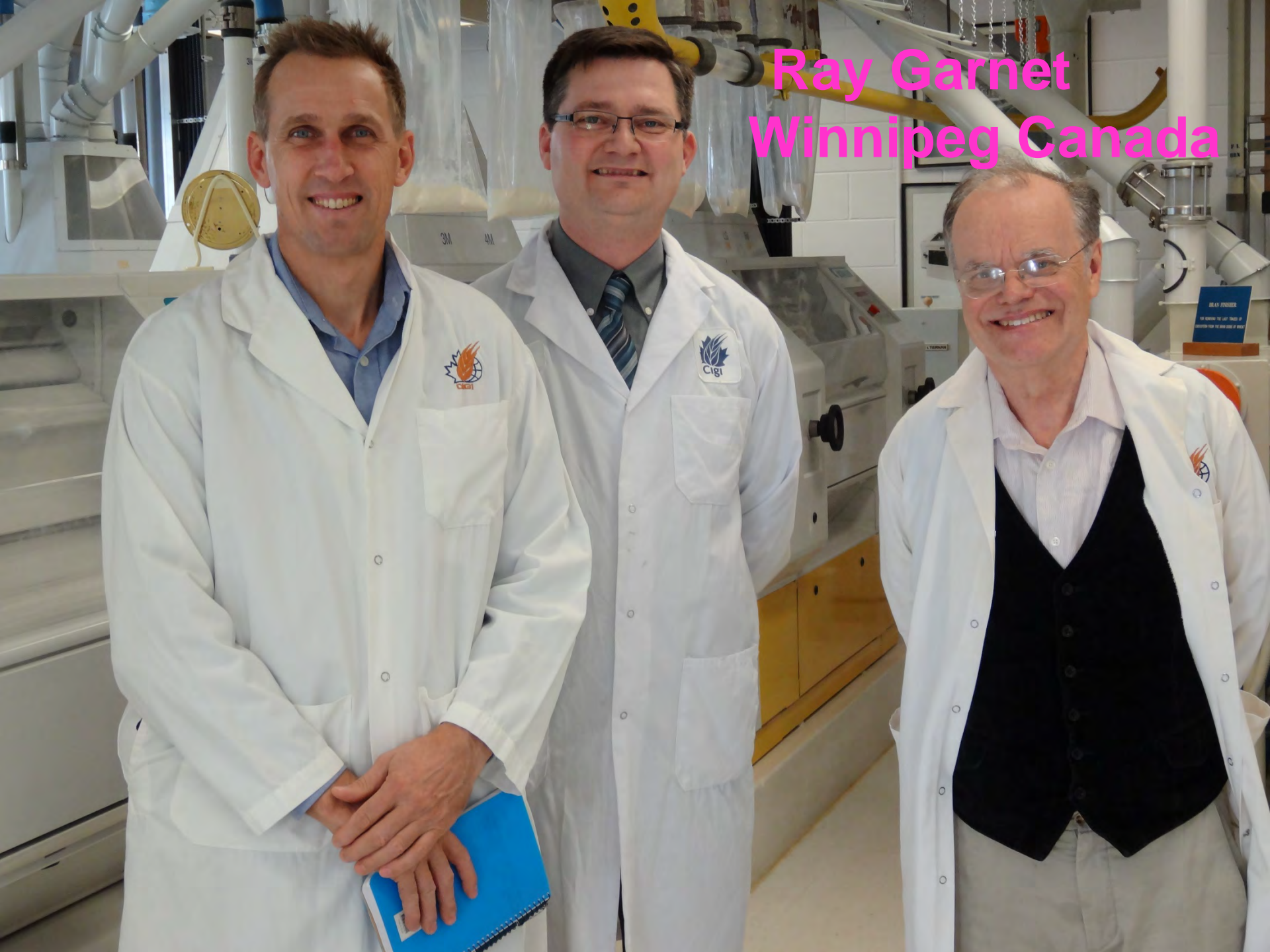
Grains
Research &
Development
Corporation

Your GRDC working with you

Weatherquest team Norwich England

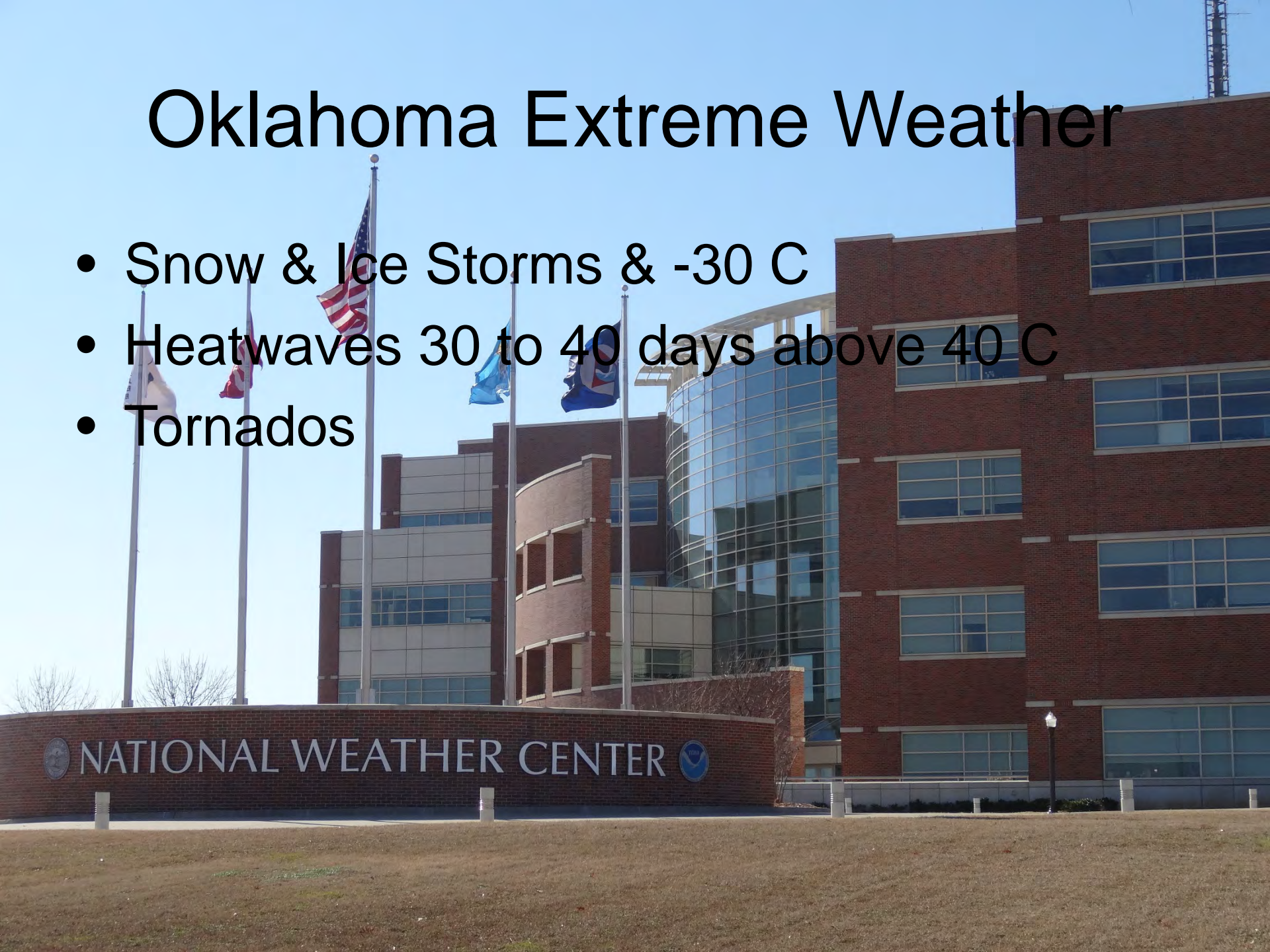


Ray Garnet
Winnipeg Canada



Oklahoma Extreme Weather

- Snow & Ice Storms & -30 C
- Heatwaves 30 to 40 days above 40 C
- Tornadoes



INTA Research Centre Anguil La Pampa Argentina

- 60% variation in rainfall

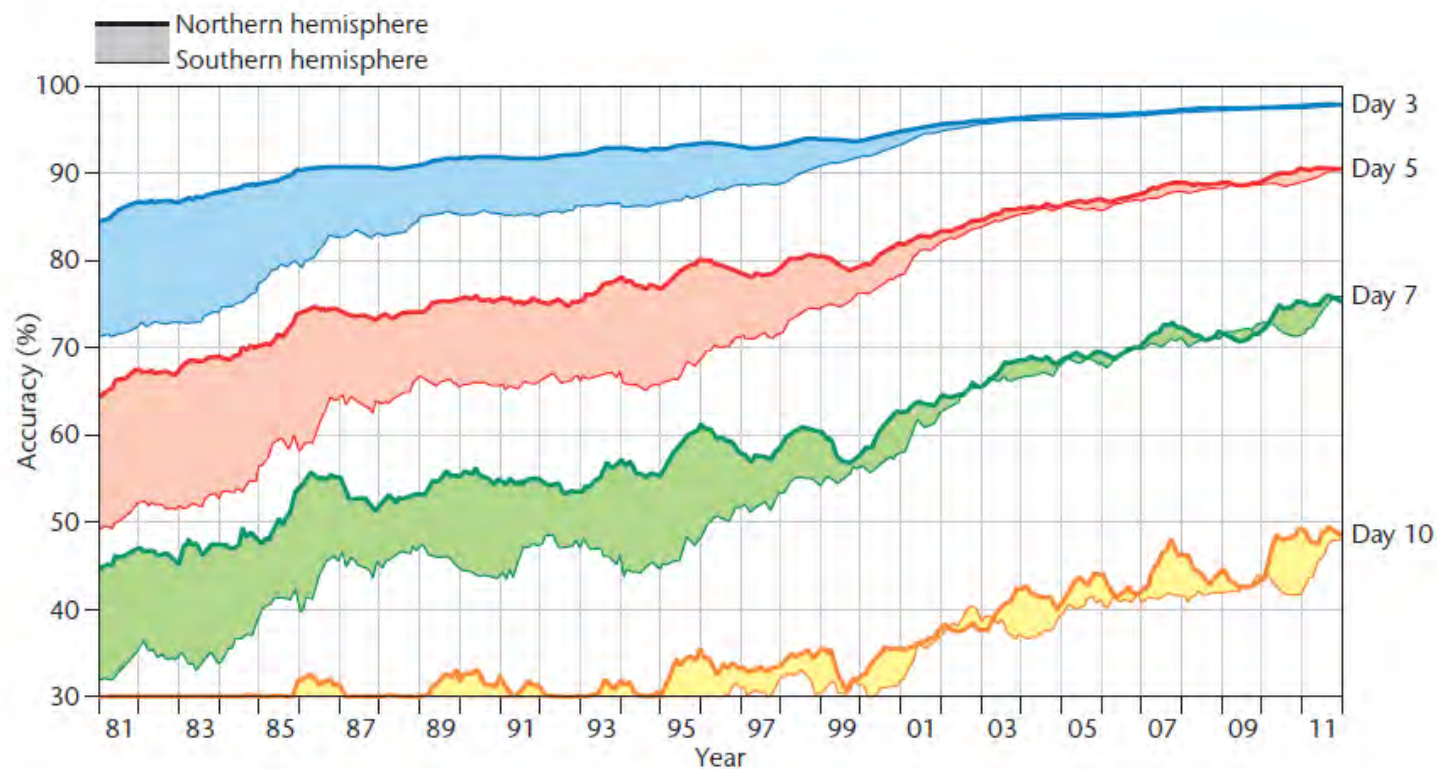


Ken Ring New Zealand

- Solar Cycles
- Lunar Cycles
- Effect of Planetary Orbits

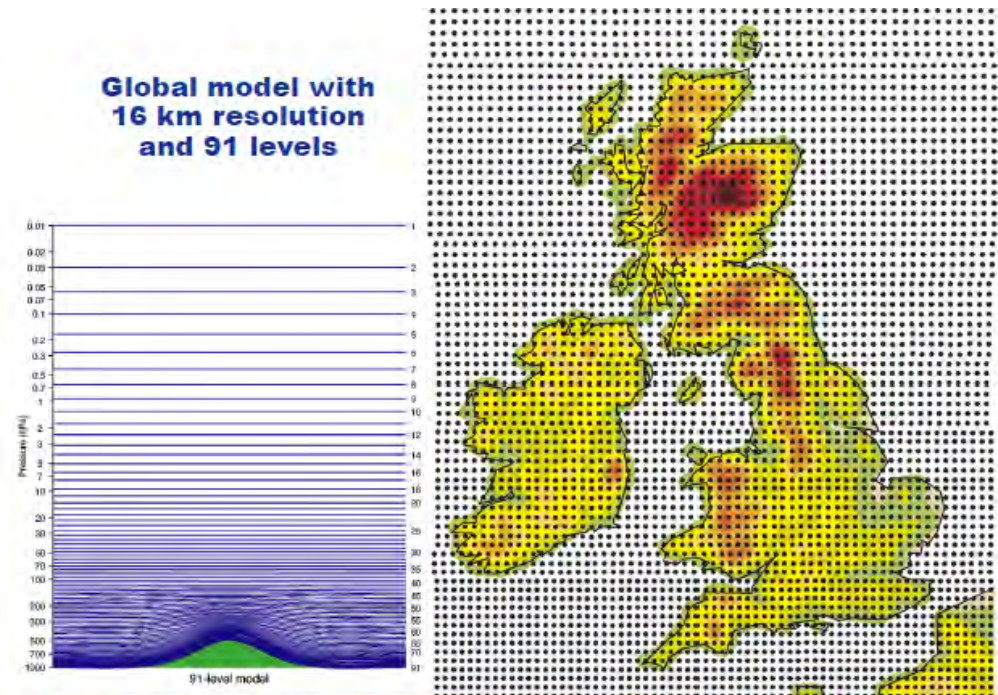


How has Weather Forecasting Improved in the last 30 years?

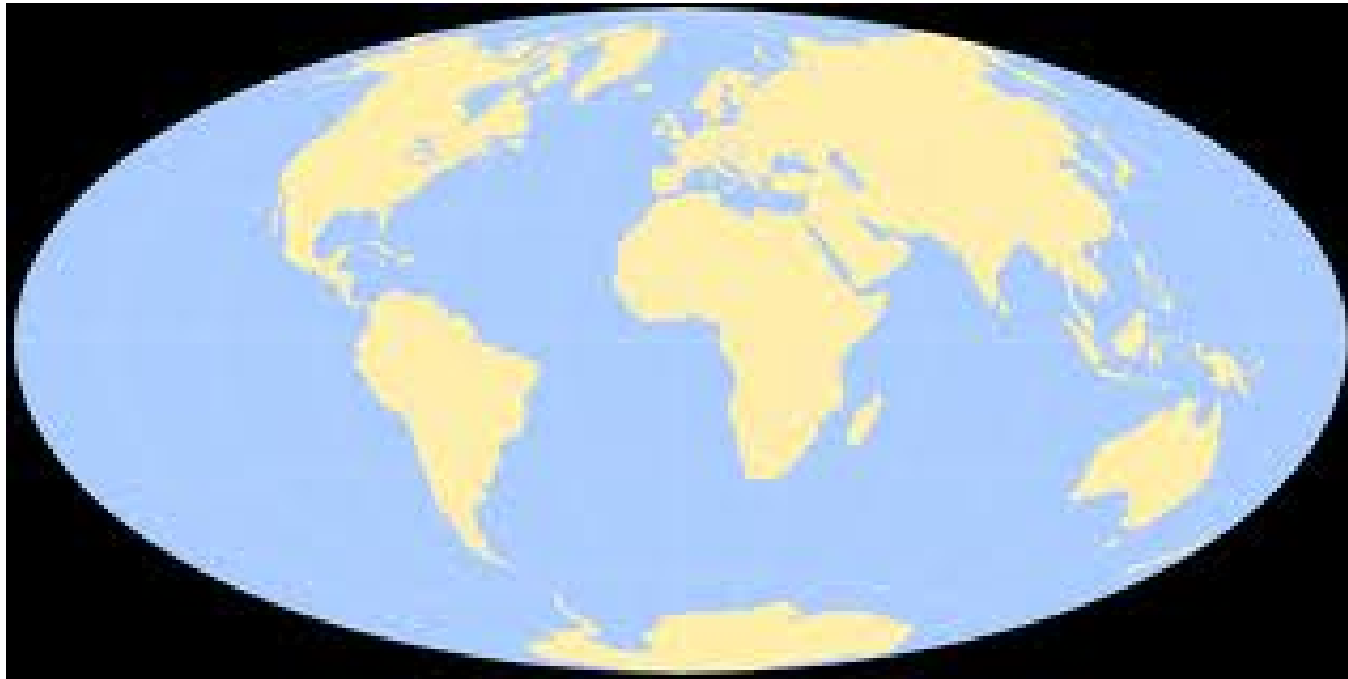


Why has computing power improved forecasting?

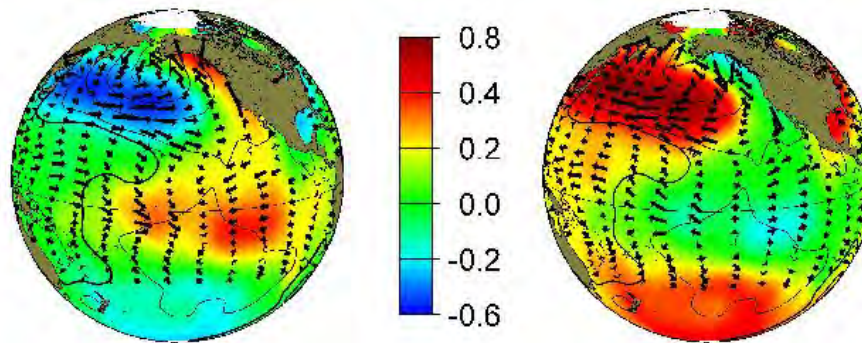
- Weather forecasts begin with recorded observations.
- Estimations are made in a 3 dimensional grid pattern at 10 minute time intervals.
- The smaller the grid the greater the accuracy and the more computing power



Why did satellite technology improve forecasting for the Southern Hemisphere?



What is a Teleconnection?



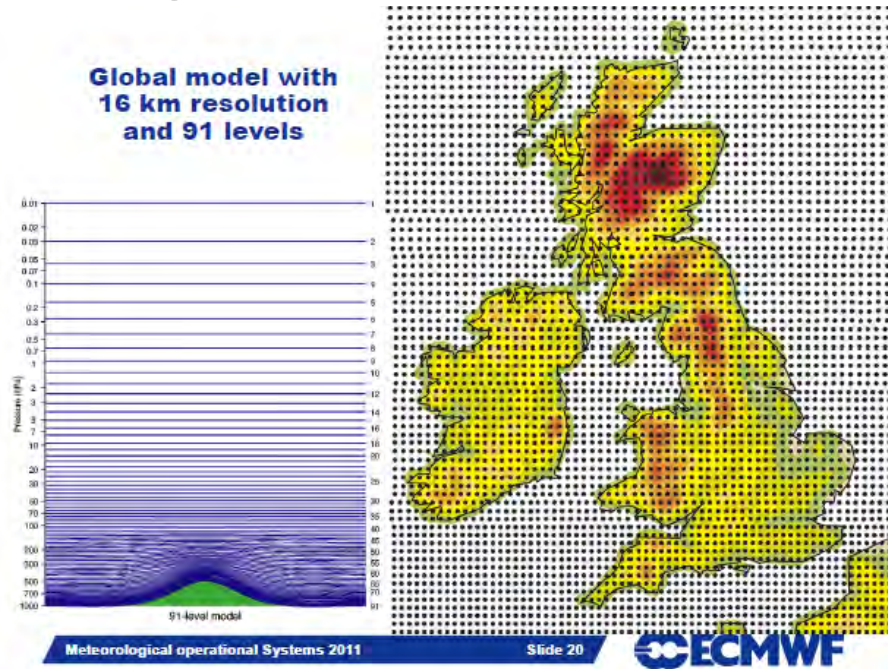
PDO cool Phase

PDO warm phase

*World map showing Pacific Decadal Oscillation (PDO)
in a positive & negative phase*

What is ensemble forecasting?

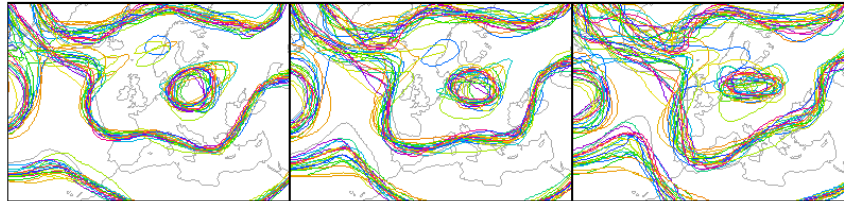
- A group of forecasts (ECMWF use 51)
- Each forecast begins with different errors embedded



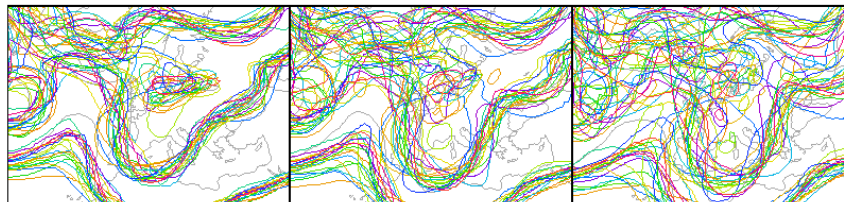
What is ensemble forecasting?

- The errors account for uncertainty
- Ensemble forecasting provides a way to generate statistical forecasts

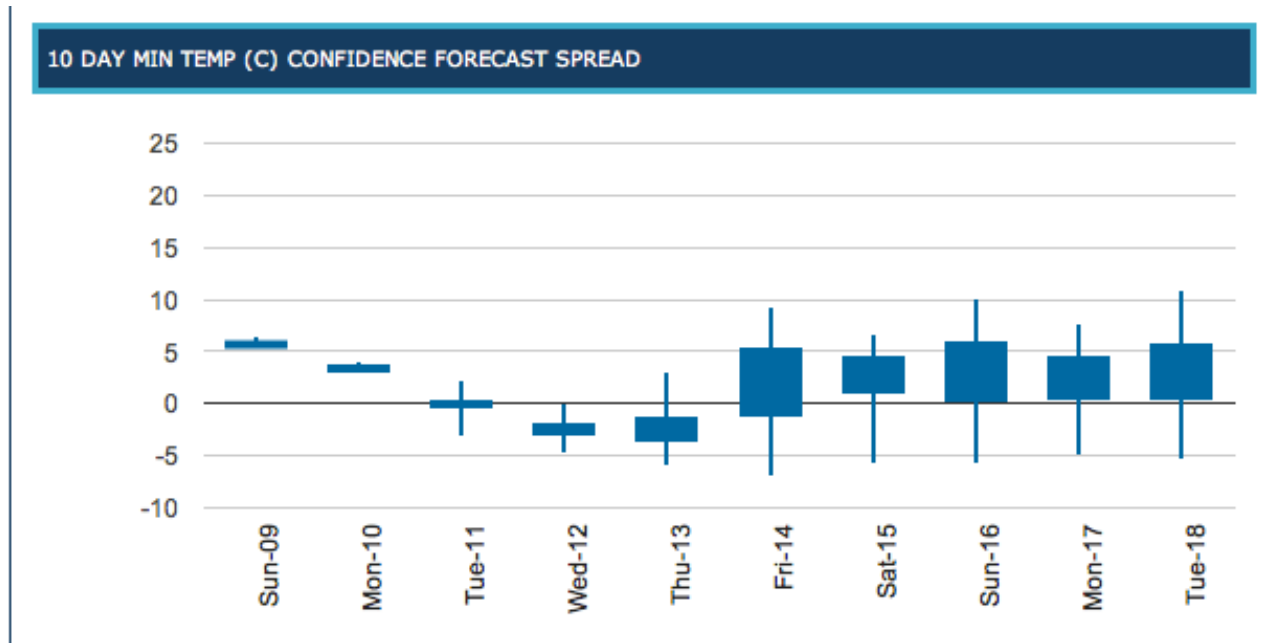
VT: Sat 12.01.13 12 GMT (Wed 00+84) VT: Sun 13.01.13 00 GMT (Wed 00+96) VT: Sun 13.01.13 12 GMT (Wed 00+108)



VT: Mon 14.01.13 00 GMT (Wed 00+120) VT: Mon 14.01.13 12 GMT (Wed 00+132) VT: Tue 15.01.13 00 GMT (Wed 00+144)



How can we use probability based forecasting better?



Key findings

- Can 100% accuracy be achieved in forecasting?
- Who provides the best forecasts?
- What is Micro meteorology?

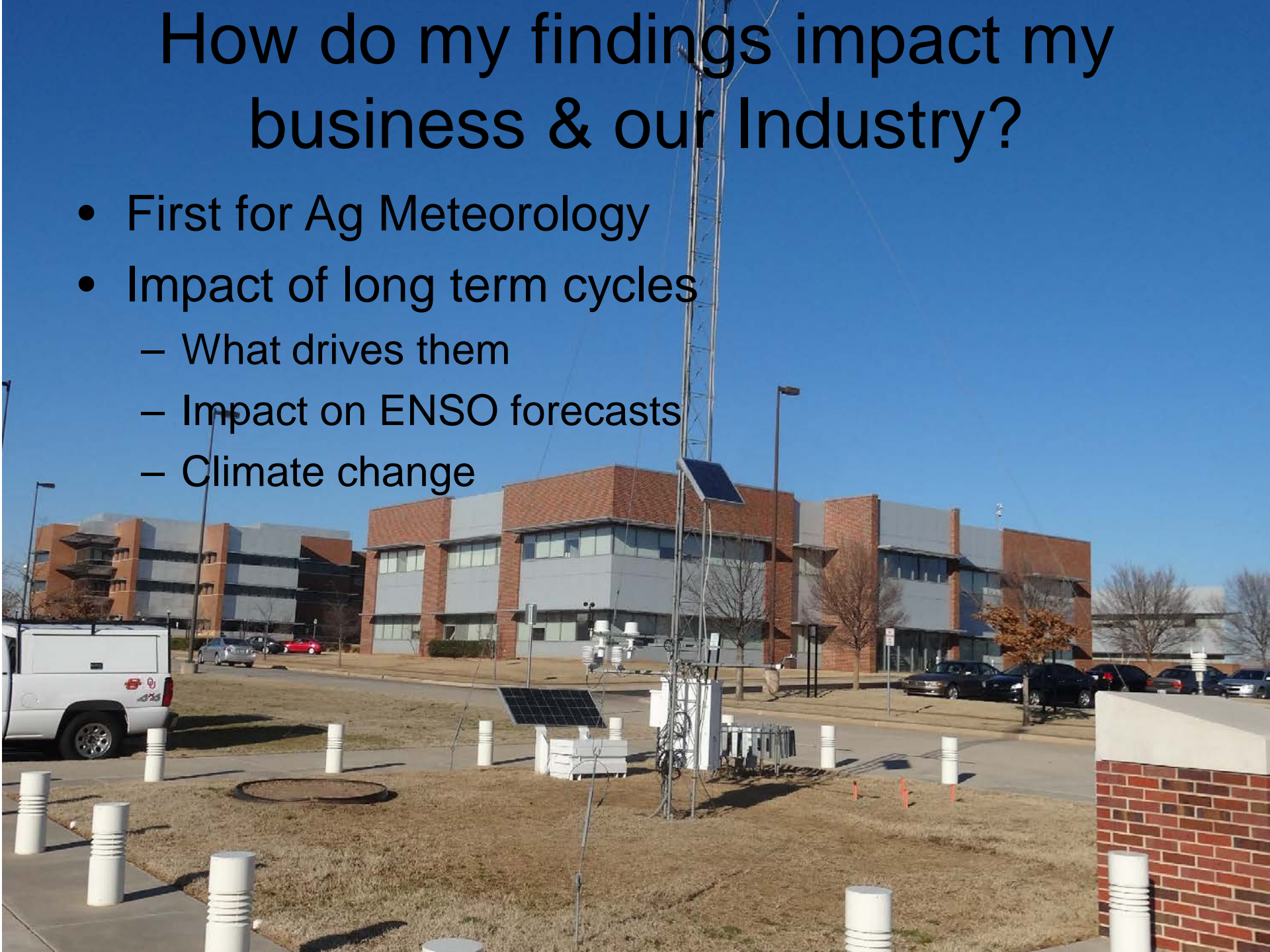
How did the Scholarship Impact me?

- Personal growth
- Changed my perspective
- Unlocked doors

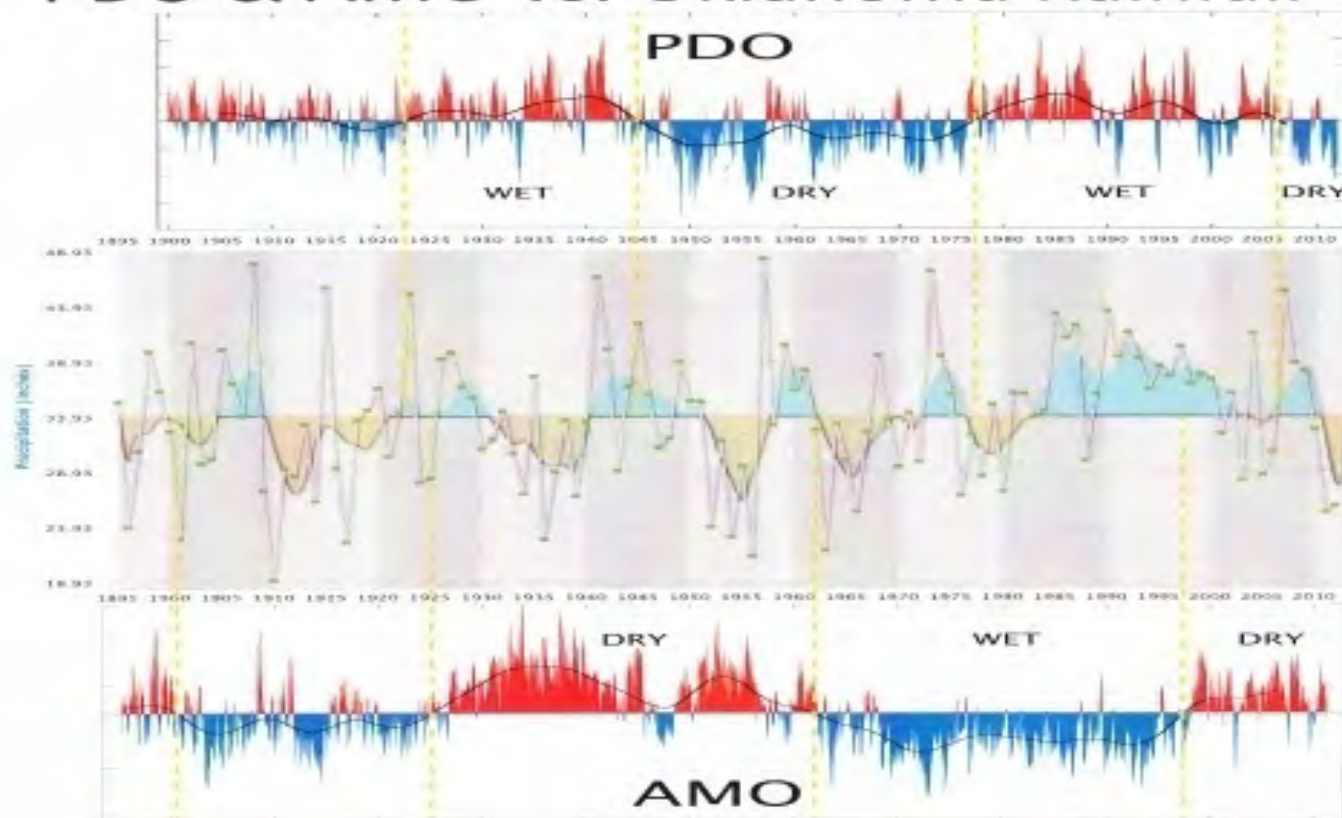


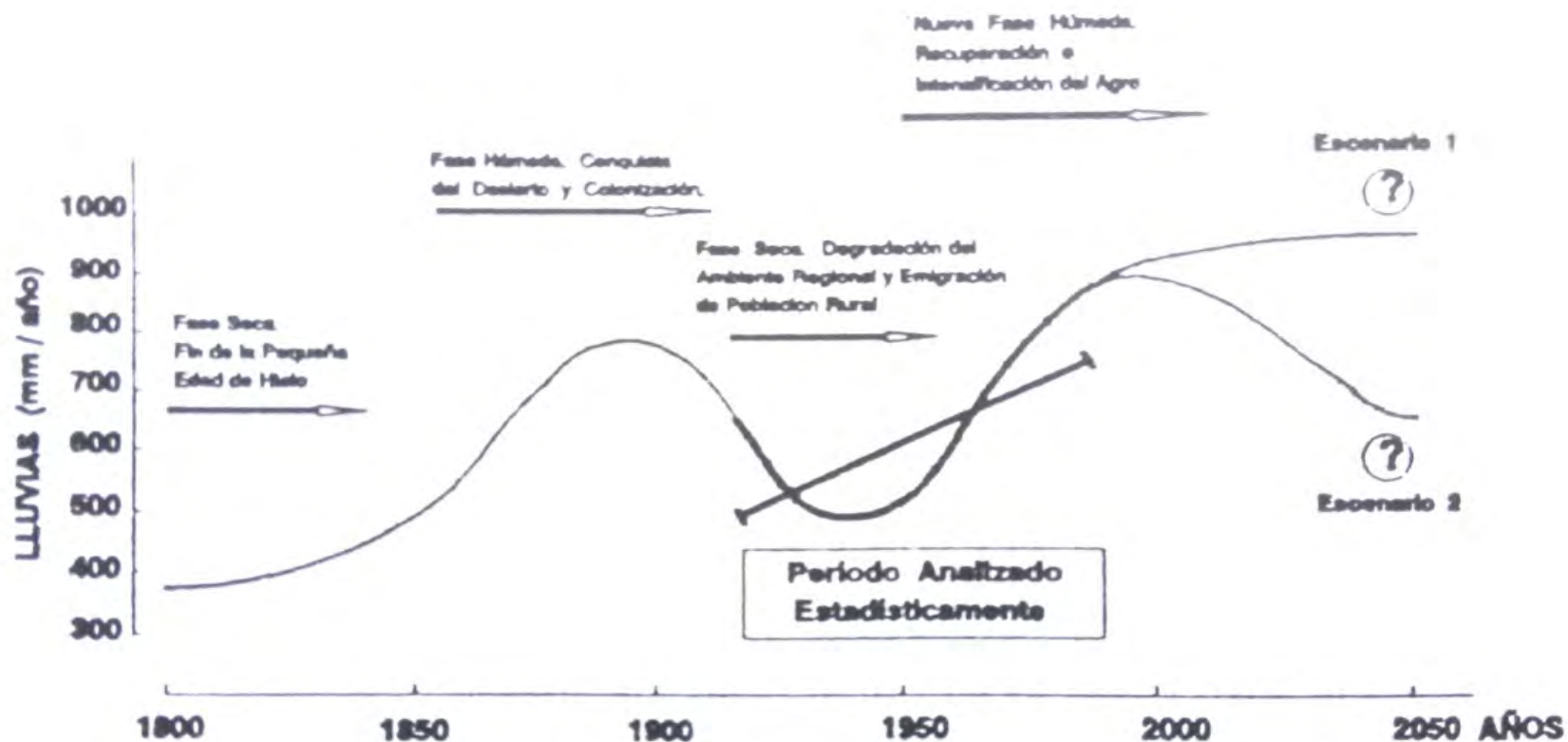
How do my findings impact my business & our Industry?

- First for Ag Meteorology
- Impact of long term cycles
 - What drives them
 - Impact on ENSO forecasts
 - Climate change

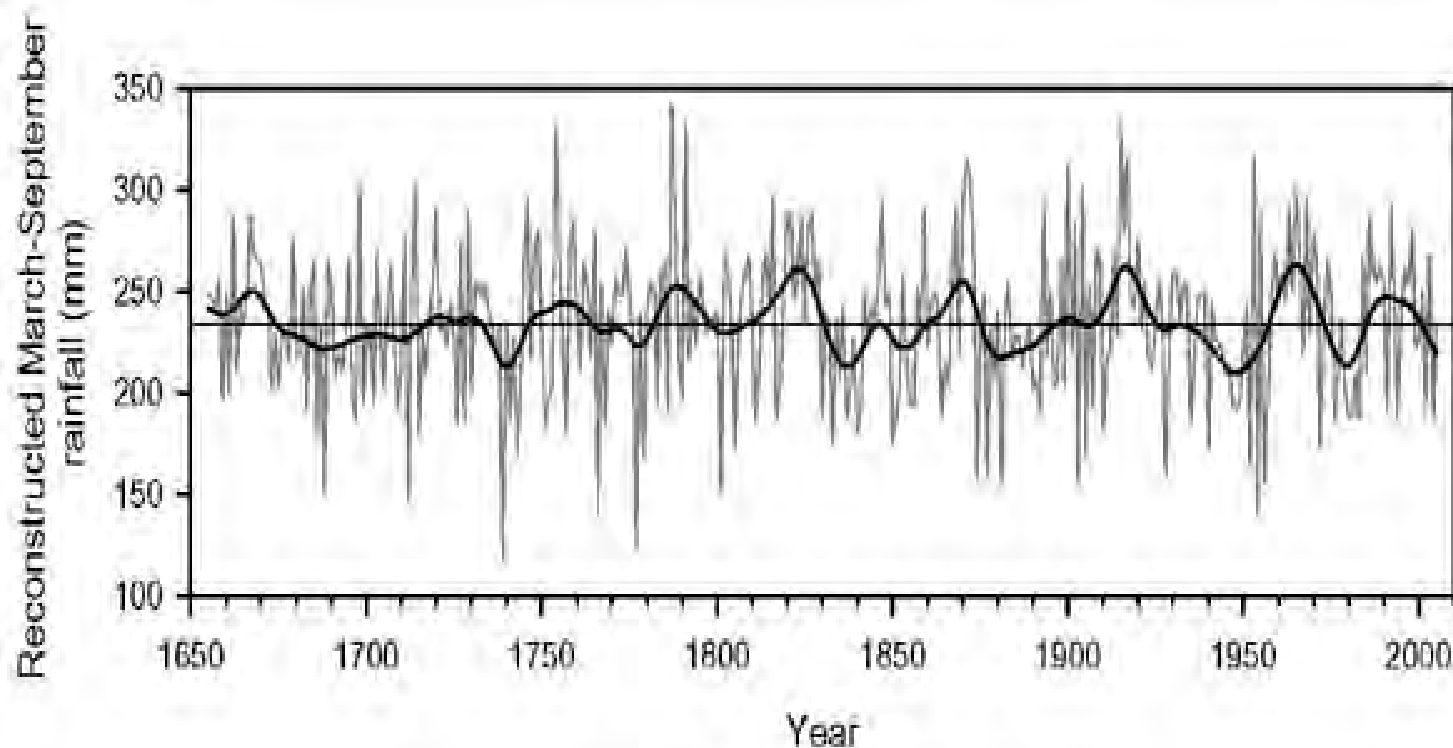


PDO & AMO vs. Oklahoma Rainfall





Reconstructed March to September Rainfall WA



How do my findings impact my business & our Industry?

- Potential of non mainstream forecasting techniques



Bush Rainfall Forecasting Aids

Ian Holton

Copyright: Ian Holton, 2007. <http://www.holtonweather.com.au> website.)

- Ants building high mounded ant-holes & moving eggs up on fence posts
- Black clouds of flying ant swarms above treetops
- Springs starting to flow when the weather is dry
- Plovers arriving earlier than normal



Bush Forecasting Aids

Ian Holton

Copyright: Ian Holton, 2007. <http://www.holtonweather.com.au> website.)

- Emus laying eggs means rain coming in a few weeks
- Lizards sitting on the top of fence posts or in trees (Facing the east in SA Mallee)
- Local area kangaroos found in areas that they don't normally move through



Bush Forecasting Aids

Ian Holton

Copyright: Ian Holton, 2007. <http://www.holtonweather.com.au> website.)

- Huntsman spiders moving inside the house, means rain in a couple of weeks
- Winter type rains will start when the last leaf drops off the fig or apricot tree
- Spiders silk webs floating in the air, and catching on trees, grass & fence-wire



Bush Forecasting Aids

Ian Holton

Copyright: Ian Holton, 2007. <http://www.holtonweather.com.au> website.)

- Mice and rats moving into and/or nesting in roofs and high places
- Floods in Indian sub-continent mean floods in Australia in 2 to 4 months time
- Winter rains will not start until 4 to 6 weeks after the last tropical cyclone off Western Australia



How do my findings Impact my Business & our Industry?

- Impact of the local environment on weather
 - Evapotranspiration
 - Convection



How do my findings Impact my Business & our Industry?

- Manage risk don't increase risk





Thank you