Summer 2016 Cathryn Birch Project Notes – use for application too

# Project Notes – Cathryn

* MJO – pocket of active convection – originates in Indian Ocean – propagates east across Maritime continent into East Pacific
* See MSS MJO animation.
* Enchanced phase 3-6 (wetter)
* Surpressed phase 7-8 and 1 (drier)
* Strongest in NE and SW monsoons
* Can we forecast this better over the tropics?
* Convection subtle – models can’t produce simulation on this.

Rainfall anomalies out of phase (blue and red overlap)

8 hases depending on blue

Why did the MJO in land and sea shift out of phase? – Why does it do this?

Can we understand it?

Looking at large scale vs small scale (sea breeze)

Sea breeze

* Sun heats land by short-wavelength radiation
* Hot air rises – convection (Low – clouds)
* Cooler air sinks – high
* Air flows towards low pressure
* Day time = onshore breeze
* Strongest in sunshine – tropics – strong solar heating of land areas
* At night, it’s the opposite – land cools by long-wave radiation but sea is the same (as specific heat capacity of water is high)
* Land breeze at night as sa result. (land to sea)

Mountain in Sumatra – sea breeze + orogaraphic lift = convection = storms.

* strength of process differs by MJO phase
* See p 55
* Strength of sea breeze also varies by phase of MJO – see graph p 52 bottom
* Hypothesis: interplay between large scale moisture advection caused by MJO and mesoscale sea.

Radiosonde

* Balloon – H3 and H with instrument suspended
* Helim boyant – lifted up – temperature, pressure, humidity.
* Information fed to weather forecast models – use for research.

Synop data

* Weather maps
* Tripod – 2m high – wind vane, barometer, anemometer, temp, pressure, humidity
* Seen at airports – 3-hr measurements
* Sent to international central place – data and forecast models.
* Most stations in Sumatra on coast!

Project aim

* Use data for 30 stations – get wind speed and direction – vector
* Know orientation of coast – rotate vector – wind to be perpendicular
* Plot wind by MJO phase
* Should look like a valley in 8 phases.
* Prove the relationship

2 ways

1. Manually draw on map to work out orientation – use maths formula
2. But working out orientation for 30 stations hard
3. Write algorithm or by hand.
4. Can I write down steps for computer to model this?

Could I write the syntax and program in the language?