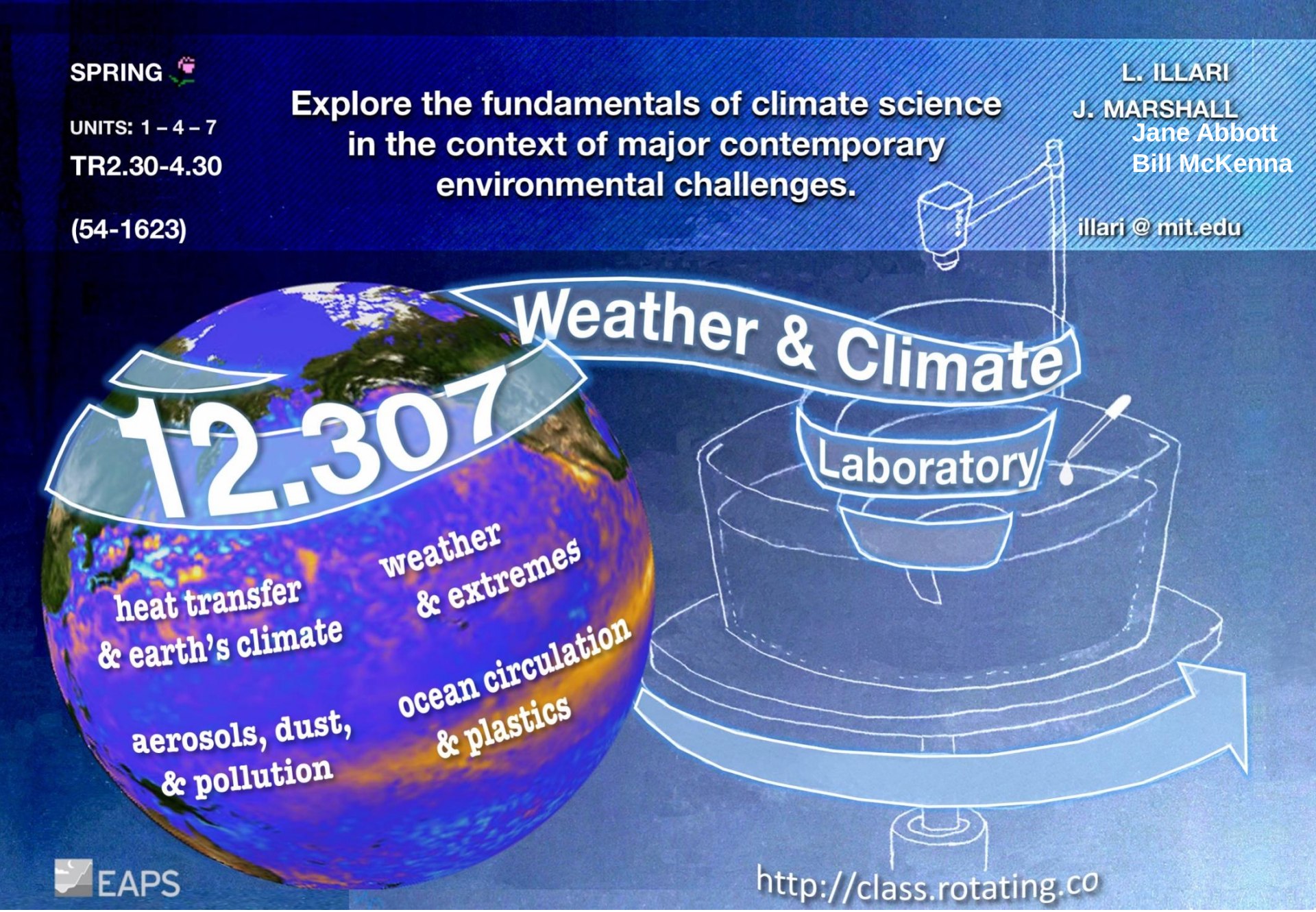


http://weatherclimatelab.mit.edu/

12.307 - Welcome back! **March 31, 2020**

Sharing our stories

Schedule, deadlines and office hours

Review of past projects

NEW Project: Heat and Moisture Transport
Intro – General Circulation of the Atmosphere

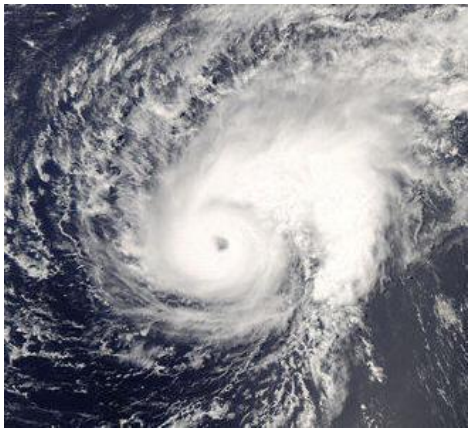
Break

Fluid labs – matrix of 3 experiments

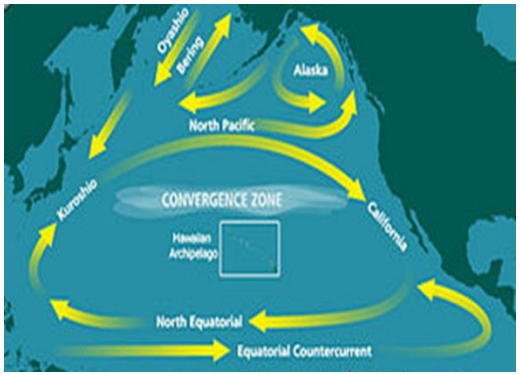
Grading based on 3 project reports: PE, NE, IE

12.307- Weather and Climate Laboratory

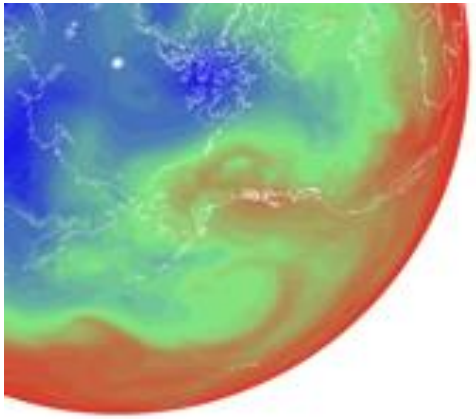
Project 1:
Weather & Extremes
- hurricanes and winter blizzards



Project 2:
Tracer Transport
- aerosols, plastic in the ocean



Project 3:
Heat and Moisture Transport
- the general circulation



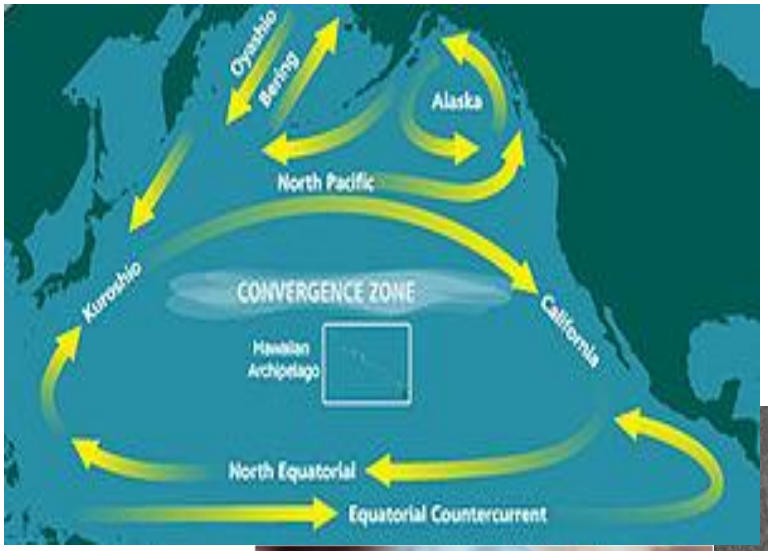
(Project 4: Dig Deeper/Review of a previous project)

P1- Weather and Extremes

hurricanes, winter blizzards, tornadoes

Hurricanes Maria and Jose, Sept 2017 (EO)

P2 – Tracer transport - aerosols, dust and plastics



Garbage patches in the ocean

Some of it is eaten by marine life, which it harms or we eat!

It's important to properly dispose of trash

P3: Heat and Moisture Transport
the general circulation

http://synoptic.mit.edu

Over to John – Intro to Project 3: General Circulation of the Atmosphere

Before
Sketch what you are expecting the flow to look like

$\Omega = 0$	$\Omega =$ small	$\Omega =$ large
$\Delta T =$large	$\Delta T =$large	$\Delta T =$large

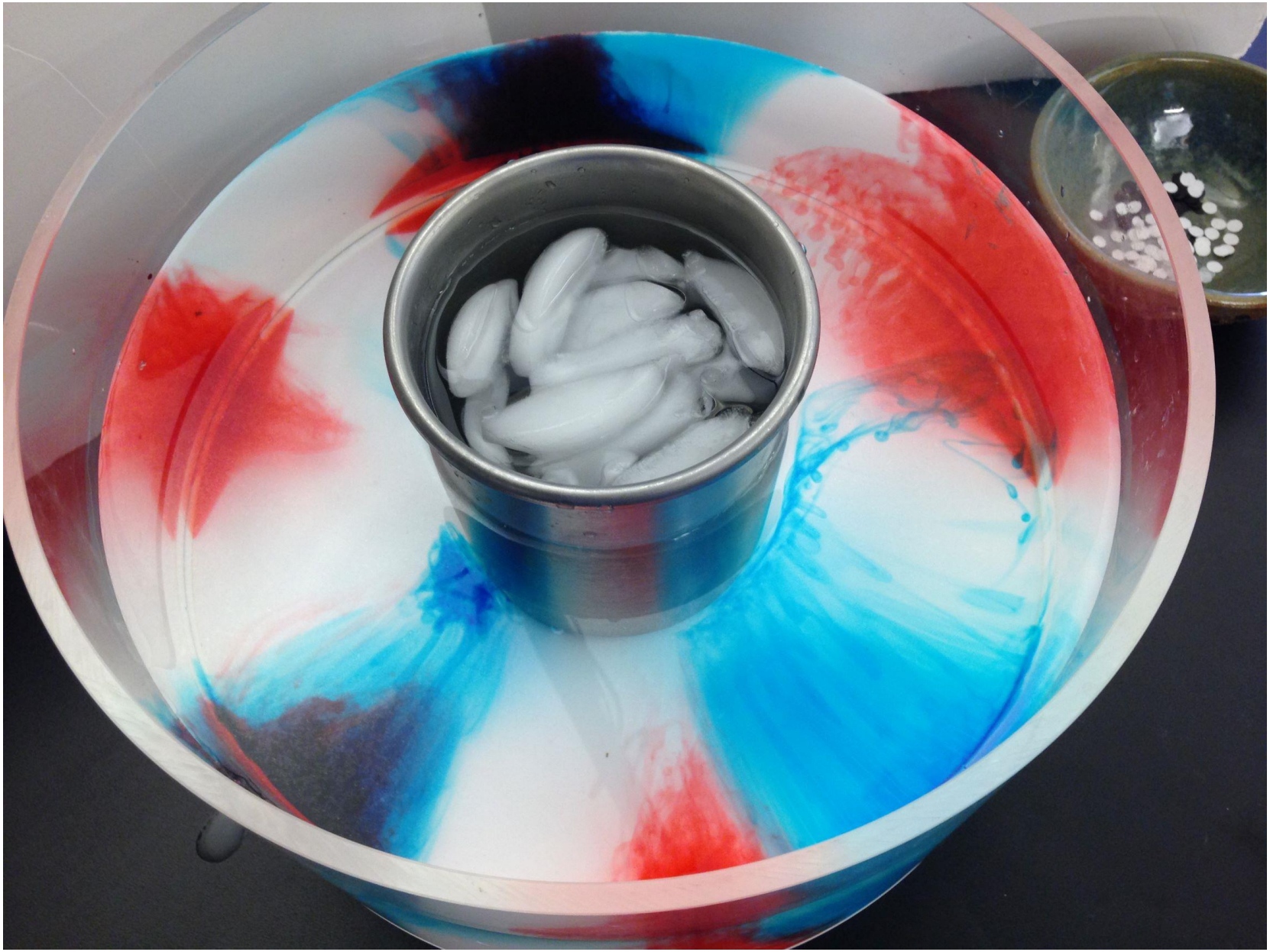
After
Sketch the flow you observe

$\Omega = 0$	$\Omega =$ small	$\Omega =$ large
$\Delta T =$large	$\Delta T =$large	$\Delta T =$large

Assignment:
Repeat the no-rotation experiment at home
Post photos on dropbox

Example

1. $\Omega = 0$ ΔT = large



2. $\Omega = 0$ ΔT = large

12.307 P3 – Hadley Circulation **April 2, 2020**

Syllabus, grading, groups – Lodo (5 mins)

Describe Virtual Lab – Bill (5 mins)

Concept question with sketches – John (10 mins)

Show experiment with evolving plume – Bill (10 mins)

Theory (2 layers) – John (15 mins)

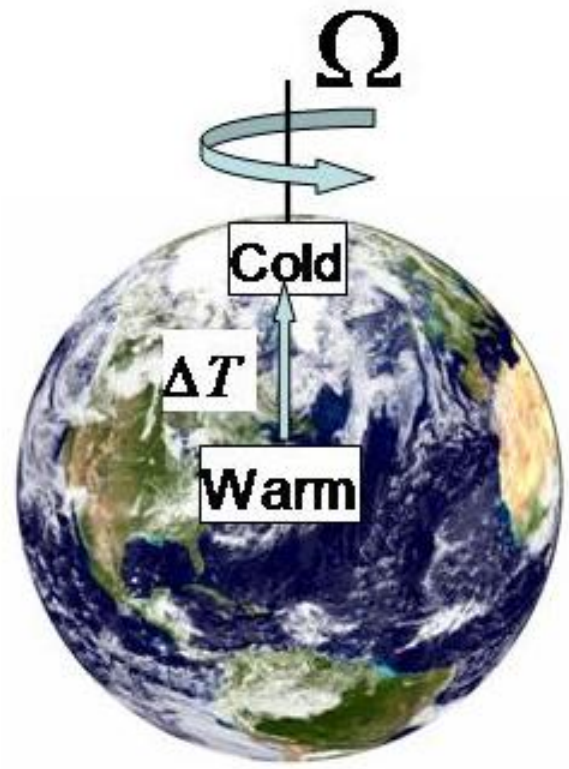
Break

Experiment set up, sensors, data (stress calculations)

Connection to Atmosphere

General Circulation of the atmosphere

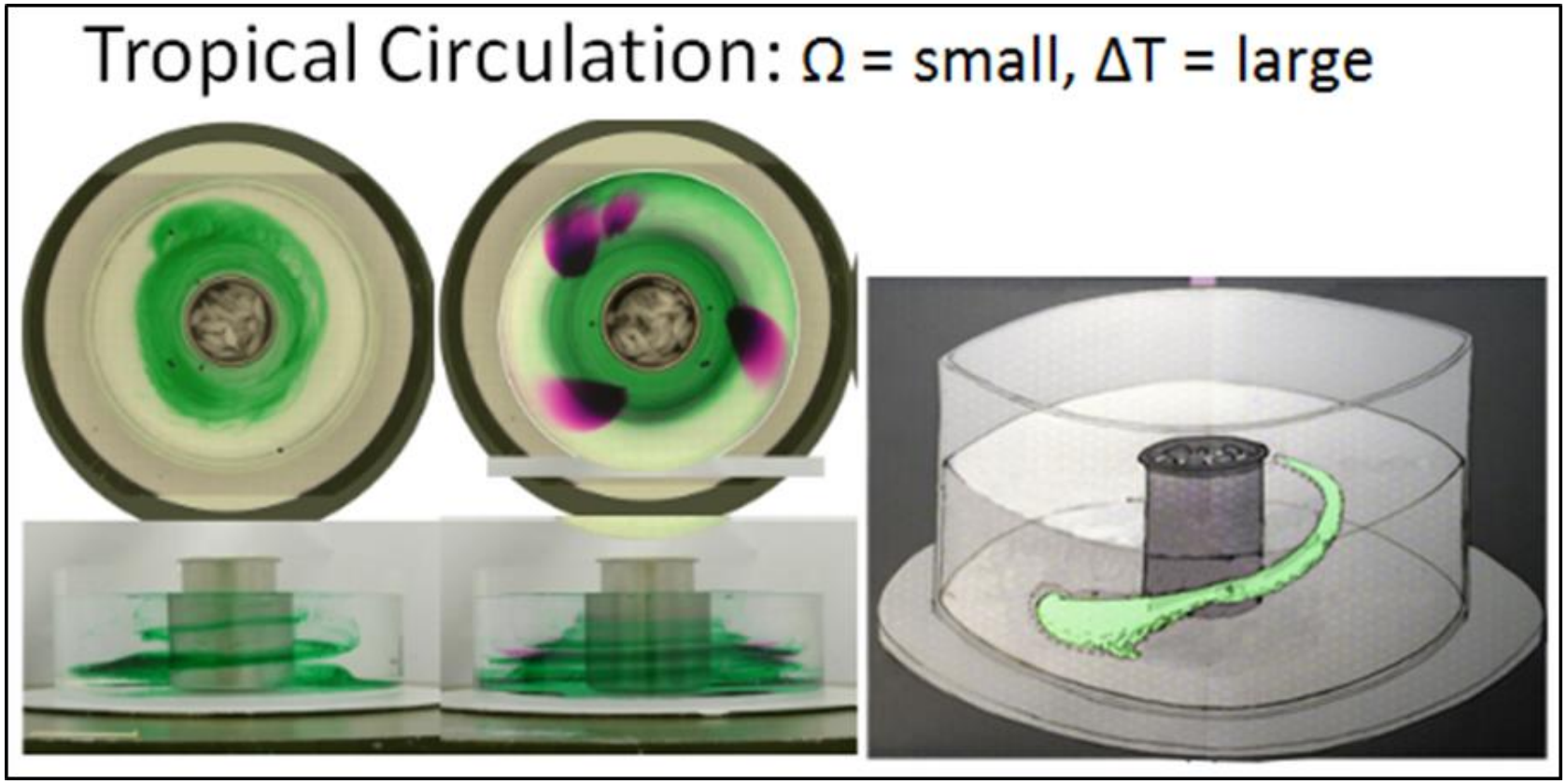
1. Pole – Equator Temperature Difference
2. Earth rotation



Two experiments	Two regimes
Ω = large ΔT = large →	Mid-latitude weather systems
Ω = small ΔT = large →	Tropical Hadley cell circulation

Laboratory abstraction of Earth's weather

Hadley Cell Experiment



http://lab.rotating.co

Esglobe:
http://eddies.mit.edu/esglobe/307
to show
upper level westerlies (250mb)
and
low level easterlies (850 mb)

Connection between atmospheric circulation and tank experiment

https://www.dropbox.com/s/me4o5qk9go77j56/Fig6.png?dl=0

Eddies Experiment