

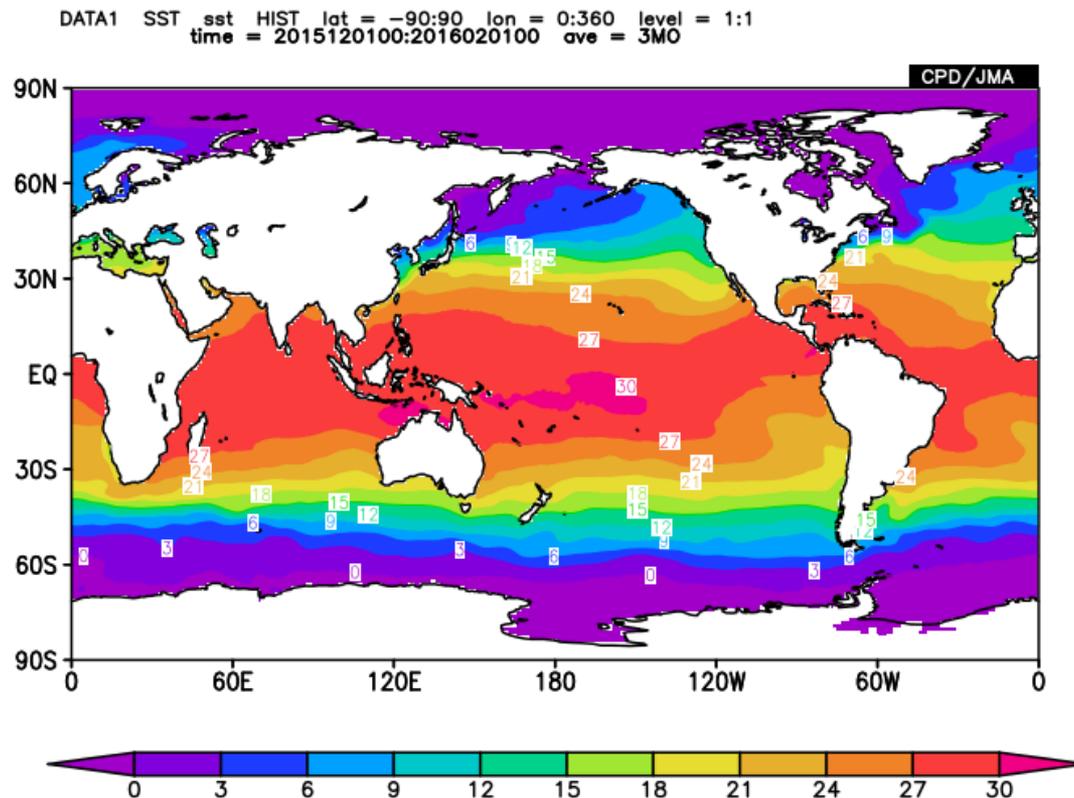
# iTacs Drill



# Q1-1: X-Y map -time average(1)-

Make a monthly mean SST map for January 2016.

Variable: SST (hist)  
Period: January 2016



# A1-1: X-Y map -time average(1)-

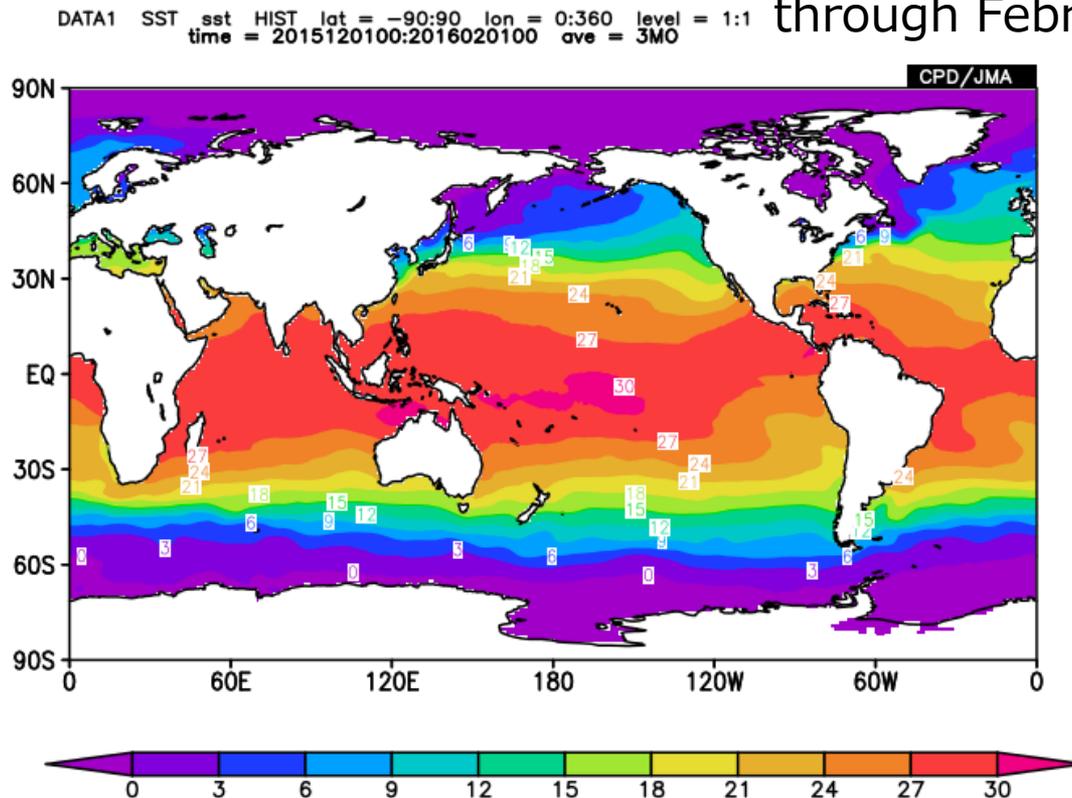
## Data1

Dataset	Element	Data type	Area	Level	Time unit	Showing period
SST	Sea Surface Data Temperature (SST) [C	HIST	ALL Lat: -90 - 90 Ave <input type="checkbox"/> Lon: 0 - 360 Ave <input type="checkbox"/>	1	MONTHLY <input type="checkbox"/> Ave <input type="checkbox"/> Year-to-year <input type="checkbox"/> Time filter	RANGE 2016 1 2016 1
<input type="checkbox"/> Vector <input type="checkbox"/> SD Derivative: <input type="checkbox"/> lon <input type="checkbox"/> lat						

# Q1-2: X-Y map -time average(1)-

Make a 3-month-mean SST map for the period from December 2015 through February 2016.

Variable: SST (hist)  
Period: December 2015 through February 2016



# A1-2: X-Y map -time average(1)-

## Data1

Dataset	Element	Data type	Area	Level	Time unit	Showing period
SST	Sea Surface Data Temperature (SST) [C	HIST	ALL Lat: -90 - 90 Ave <input type="checkbox"/> Lon: 0 - 360 Ave <input type="checkbox"/>	1	MONTHLY <input checked="" type="checkbox"/> Ave <input type="checkbox"/> Year-to-year <input type="checkbox"/> Time filter	RANGE 2015 12 2016 2

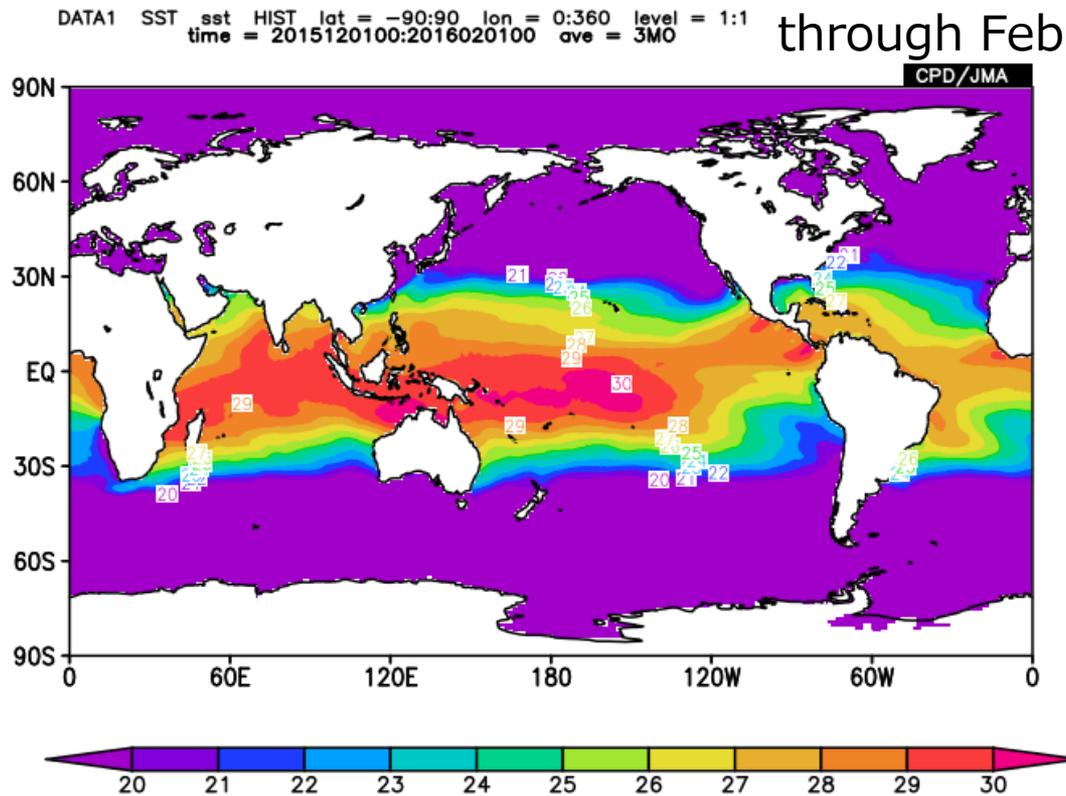
Vector  SD  
Derivative:  lon  lat

Don't forget to check the average box.

# Q1-3: X-Y map -contour-

Modify the contour interval appropriately so as to see the SST structure in the Tropics.

Variable: SST (hist)  
Period: December 2015  
through February 2016



# A1-3: X-Y map -contour-

## Data1

Dataset	Element	Data type	Area	Level	Time unit	Showing period
SST	Sea Surface Data Temperature (SST) [C	HIST	ALL Lat: -90 - 90 Ave <input type="checkbox"/> Lon: 0 - 360 Ave <input type="checkbox"/>	1	MONTHLY <input checked="" type="checkbox"/> Ave <input type="checkbox"/> Year-to-year <input type="checkbox"/> Time filter	RANGE 2015 12 2016 2

Vector  SD  
Derivative:  lon  lat

Don't forget to check the average box.

## Graphic Options

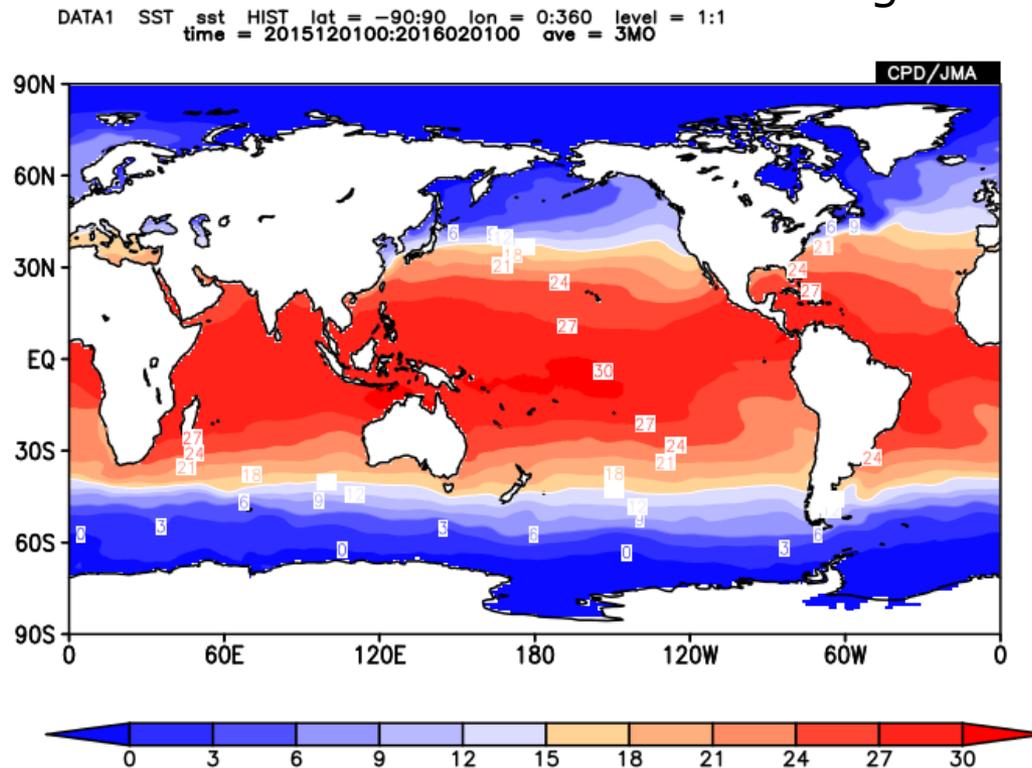
Colorizing: COLOR	<input checked="" type="checkbox"/> Show Contour Labels
Drawing: SHADE	<input checked="" type="checkbox"/> Show Color Bar
Image Format: png	<input checked="" type="checkbox"/> Set Contour Parameters for data1
Font: default	interval: 1 min: 20 max: 30
Color Table: Rainbow	<input type="checkbox"/> Set vector size: [ ] [inch] value: [ ] skip: 1

This is just an example.  
Please modify it as you like.

# Q1-4: X-Y map -color table-

Change the color table as you like.

Variable: SST (hist)  
Period: December 2015  
through February 2016



“Blue - Red” is used for this example.

# A1-4: X-Y map -color table-

## Data1

Dataset	Element	Data type	Area	Level	Time unit	Showing period
SST	Sea Surface Data Temperature (SST) [C	HIST	ALL Lat: -90 - 90 Ave <input type="checkbox"/> Lon: 0 - 360 Ave <input type="checkbox"/>	1	MONTHLY <input checked="" type="checkbox"/> Ave <input type="checkbox"/> Year-to-year <input type="checkbox"/> Time filter	RANGE 2015 12 2016 2

Vector  SD  
Derivative:  lon  lat

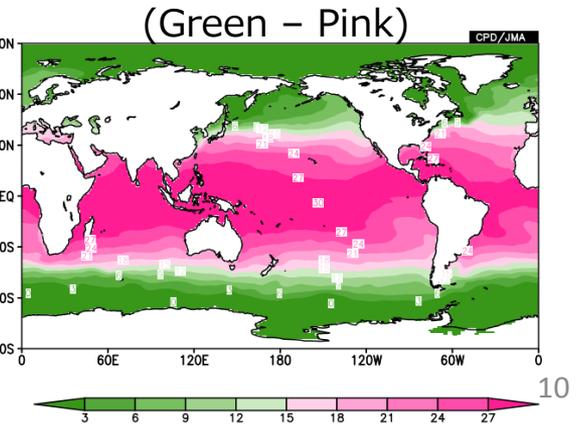
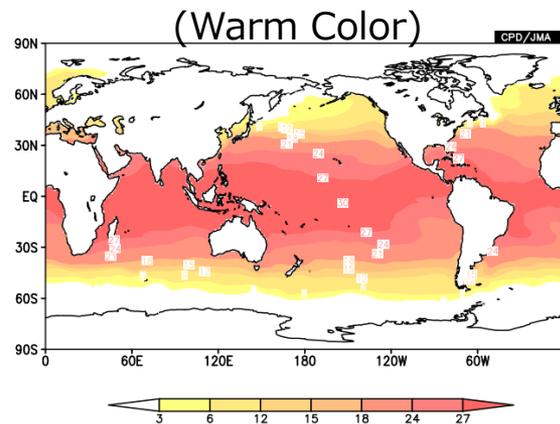
Don't forget to check the average box.

## Graphic Options

Colorizing: COLOR  Show Contour Labels  
Drawing: SHADE  Show Color Bar  
Image Format: png  Set Contour Parameters for data 1  
Font: default interval: min: max:  
Color Table: Blue - Red  Set Vector size: [inch] value: skip: 1

- Blue - Red
- Rainbow
- Red - Blue
- Blue - Red
- Brown - Green
- Green - Brown
- Green - Pink
- LightBlue - Red
- Warm Color
- Cold Color

Other color tables.....



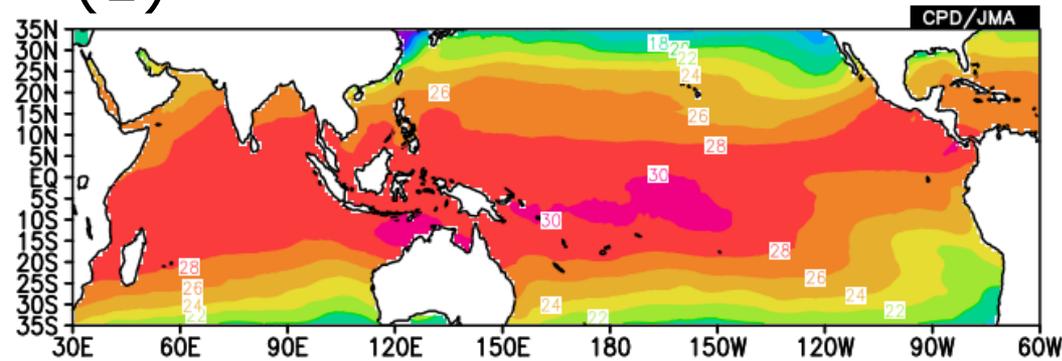
# Q1-5: X-Y map -Drawing area-

Change the area.

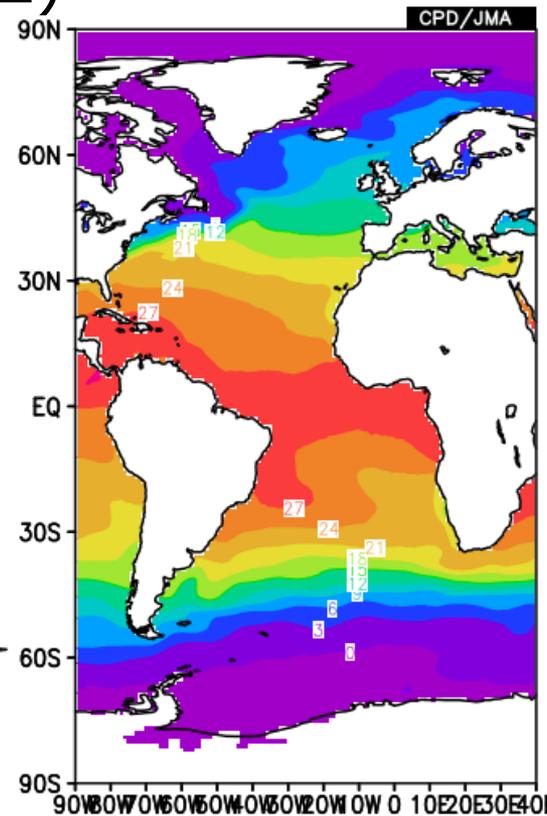
- (1) The Indian Ocean and the Pacific
- (2) The Atlantic

Variable: SST (hist)  
Period: December 2015 through February 2016

(1)



(2)



# A1-5: X-Y map -mapping area-

## (1) The Indian Ocean and the Pacific

### Data1

Dataset	Element	Data type	Area	Level	Time unit	Showing period
SST	Sea Surface Data Temperature (SST) [C	HIST	ALL Lat: -35 - 35 Ave <input type="checkbox"/> Lon: 30 - 300 Ave <input type="checkbox"/>	1	MONTHLY <input checked="" type="checkbox"/> Ave <input type="checkbox"/> Year-to-year <input type="checkbox"/> Time filter	RANGE 2015 12 2016 2

Vector  SD  
Derivative:  lon  lat

## (2) The Atlantic Ocean

### Data1

Dataset	Element	Data type	Area	Level	Time unit	Showing period
SST	Sea Surface Data Temperature (SST) [C	HIST	ALL Lat: -90 - 90 Ave <input type="checkbox"/> Lon: -90 - 40 Ave <input type="checkbox"/>	1	MONTHLY <input checked="" type="checkbox"/> Ave <input type="checkbox"/> Year-to-year <input type="checkbox"/> Time filter	RANGE 2015 12 2016 2

Vector  SD  
Derivative:  lon  lat

# Q1-6: X-Y map -time average (2)-

If you uncheck the average box, what will happen?

Variable: SST (hist)  
Period: December 2015  
through February 2016

## Data 1

Dataset	Element	Data type	Area	Level	Time unit	Showing period
SST	Sea Surface Data Temperature (SST) [C	HIST	ALL Lat: -90 - 90 Lon: 0 - 360	1	MONTHLY Ave <input type="checkbox"/> Year-to-year <input type="checkbox"/> Time filter <input type="checkbox"/>	RANGE 2015 12 2016 2

Vector  SD  
Derivative:  lon  lat

Uncheck!

3 months from Dec. 2015  
through Feb. 2017.

# A1-6: X-Y map -time average (2)-

## Data1

Dataset	Element	Data type	Area	Level	Time unit	Showing period
SST	Sea Surface Data Temperature (SST) [C	HIST	ALL Lat: -90 - 90 Ave <input type="checkbox"/> Lon: 0 - 360 Ave <input type="checkbox"/>	1	MONTHLY <input checked="" type="checkbox"/> Ave <input type="checkbox"/> Year-to-year <input type="checkbox"/> Time filter	RANGE 2015 12 2016 2

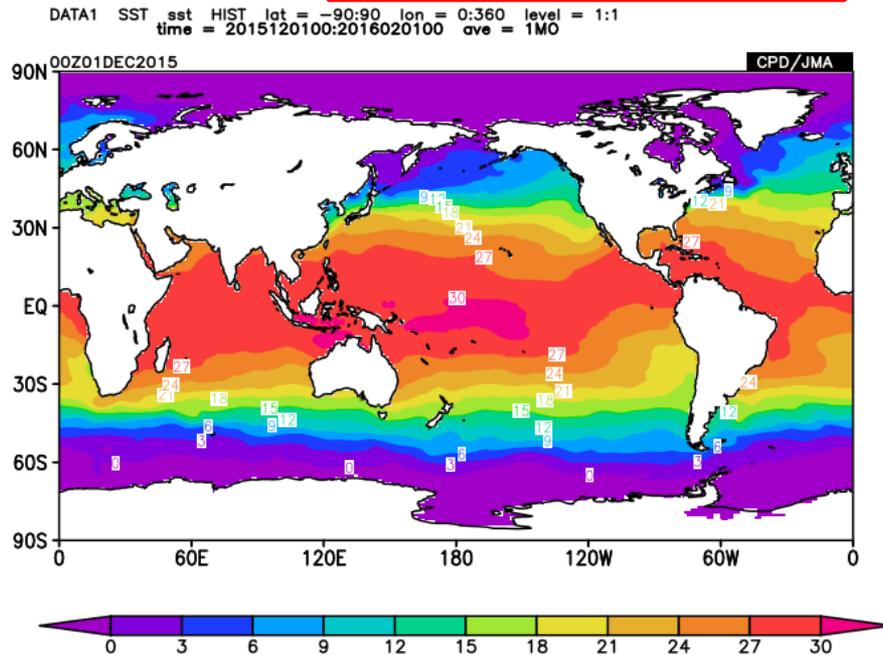
Vector  SD  
Derivative:  lon  lat

prev next animation stop reset

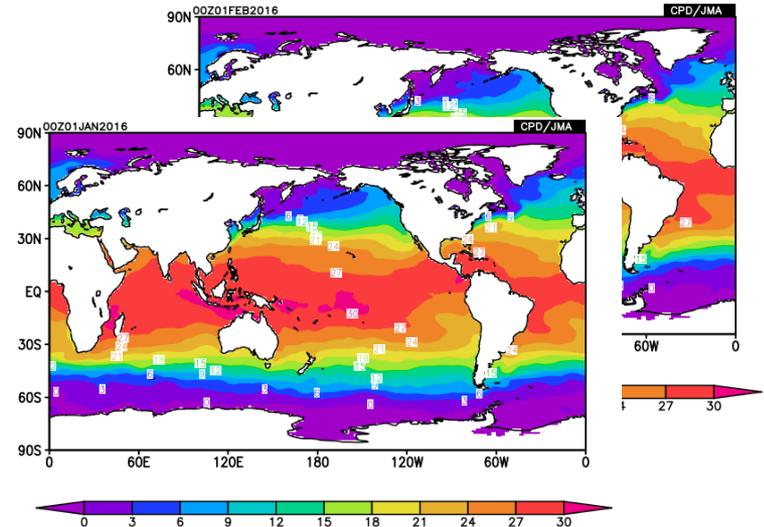
Image 1

Click "prev"/"next" to see other figures.

You will get 3 maps of monthly mean SST for December, January and February.



&



# Q1-7: X-Y map – “Year-to-year” –

Let’s see the “year-to-year” function.

Variable: SST (hist)

Period: December 2013 through February 2016

(1) Check both “Ave” and “Year-to-year”

## Data1

Dataset	Element	Data type	Area	Level	Time unit	Showing period
SST	Sea Surface Data Temperature (SST) [C]	HIST	ALL Lat: -90 - 90 Ave <input type="checkbox"/> Lon: 0 - 360 Ave <input type="checkbox"/>	1	MONTHLY <input checked="" type="checkbox"/> Ave <input checked="" type="checkbox"/> Year-to-year <input type="checkbox"/> Time filter	RANGE 2013 - 2016 12 - 2

Vector  SD  
Derivative:  lon  lat

(2) Check only “Year-to-year”

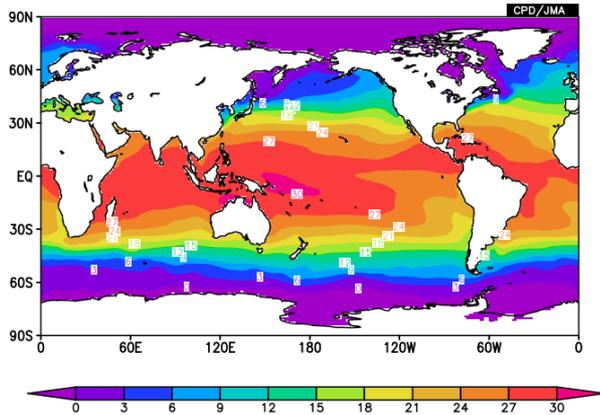
## Data1

Dataset	Element	Data type	Area	Level	Time unit	Showing period
SST	Sea Surface Data Temperature (SST) [C]	HIST	ALL Lat: -90 - 90 Ave <input type="checkbox"/> Lon: 0 - 360 Ave <input type="checkbox"/>	1	MONTHLY <input type="checkbox"/> Ave <input checked="" type="checkbox"/> Year-to-year <input type="checkbox"/> Time filter	RANGE 2013 - 2016 12 - 2

Vector  SD  
Derivative:  lon  lat

# A1-7: X-Y map – “Year-to-year” –

(1) Check both “Ave” and “Year-to-year”

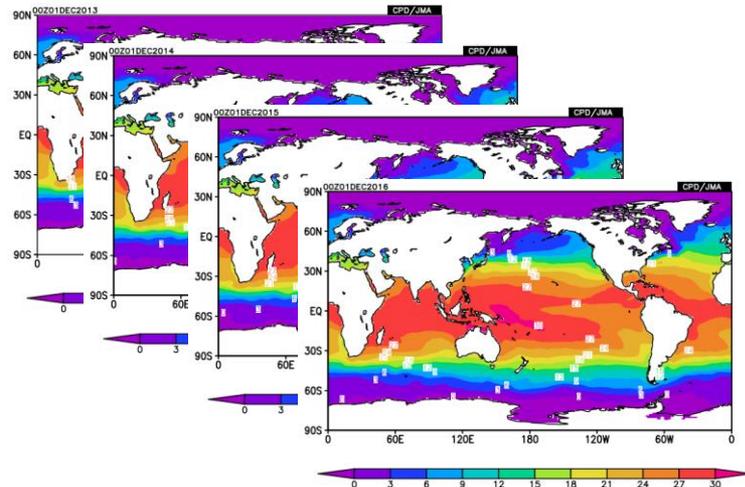


Time unit		Showing period	
MONTHLY		RANGE	
<input checked="" type="checkbox"/> Ave	<input checked="" type="checkbox"/> Year-to-year	2013	- 2016
<input type="checkbox"/> Time filter		12	- 2

Selecting consecutive DJF-means from each year and averaging them further.

<b>2013</b> ... J J A S O N D	<b>2014</b> J F M A ...
<b>2014</b> ... J J A S O N D	<b>2015</b> J F M A ...
<b>2015</b> ... J J A S O N D	<b>2016</b> J F M A ...
<b>2016</b> ... J J A S O N D	<b>2017</b> J F M A ...

(2) Check only “Year-to-year”



Time unit		Showing period	
MONTHLY		RANGE	
<input type="checkbox"/> Ave	<input checked="" type="checkbox"/> Year-to-year	2013	- 2016
<input type="checkbox"/> Time filter		12	- 2

Selecting consecutive DJF-means from each year and drawing them separately.

<b>2013</b> ... J J A S O N D	<b>2014</b> J F M A ...
<b>2014</b> ... J J A S O N D	<b>2015</b> J F M A ...
<b>2015</b> ... J J A S O N D	<b>2016</b> J F M A ...
<b>2016</b> ... J J A S O N D	<b>2017</b> J F M A ...

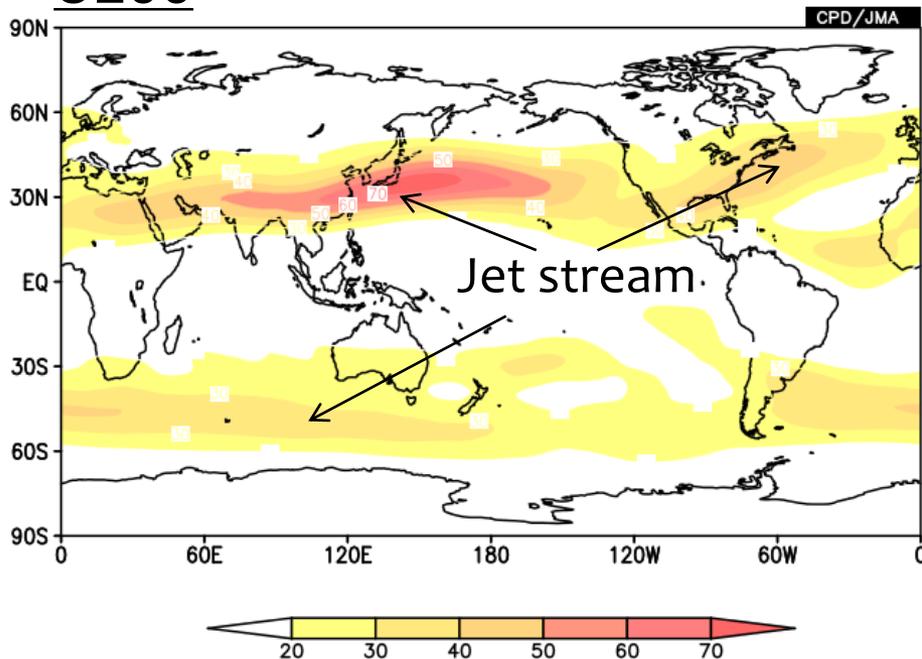
<!> For both cases, the end of period is apparently Feb. 2016, but it is Feb. 2017, actually.

# Q1-8: X-Y map –Integrated exercise–

Change the variable to zonal wind (U) and select upper-level (200hPa) and lower-level (850hPa). It would be better to change also some graphical options as appropriate to highlight their characteristics .

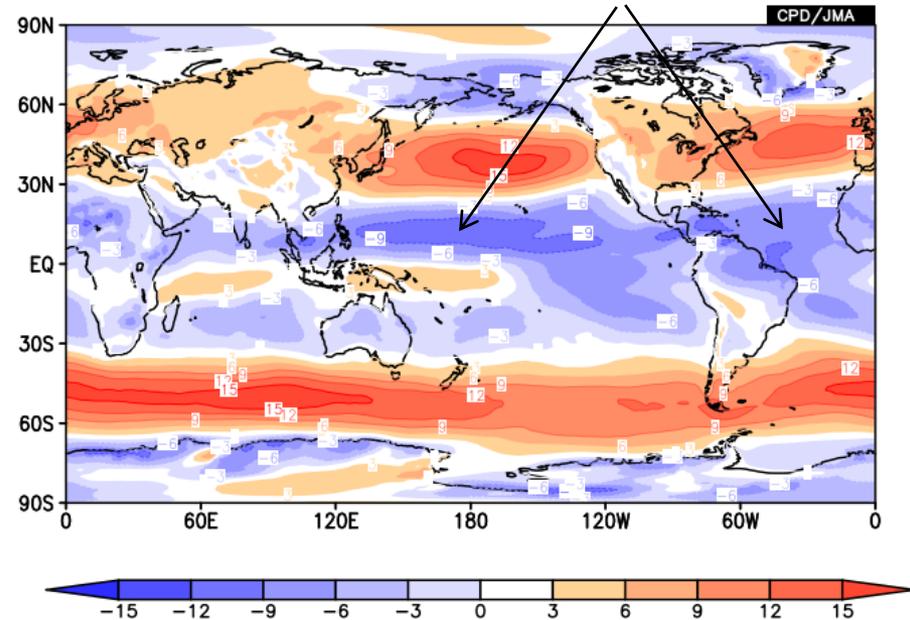
Variable: U200 (hist)  
Period: December 2015  
through February 2016

U200



Variable: U850 (hist)  
Period: December 2015  
through February 2016  
Trade winds

U850



# A1-8: X-Y map -Integrated exercise-

## Data 1

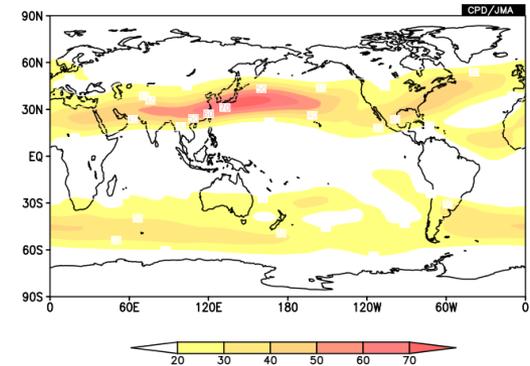
Dataset	Element	Data type	Area	Level	Time unit	Showing period
JRA-55	Pressure Levels U (Zonal Wind) [m/s]	HIST	ALL Lat: -90 - 90 Ave <input type="checkbox"/> Lon: 0 - 360 Ave <input type="checkbox"/>	200hPa	MONTHLY <input checked="" type="checkbox"/> Ave <input type="checkbox"/> Year-to-year <input type="checkbox"/> Time filter	RANGE 2015 12 2016 2

Vector  SD  
Derivative:  lon  lat

## Graphic Options

U200

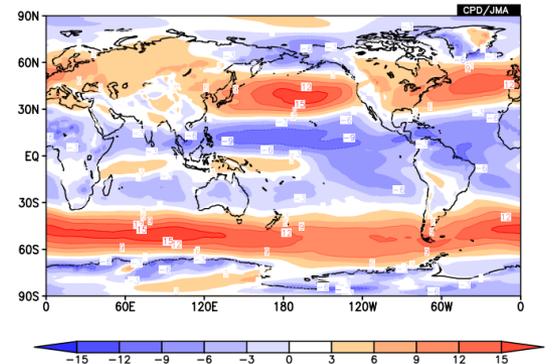
Colorizing: COLOR	<input checked="" type="checkbox"/> Show Contour Labels
Drawing: SHADE	<input checked="" type="checkbox"/> Show Color Bar
Image Format: png	<input checked="" type="checkbox"/> Set Contour Parameters for data1
Font: default	interval: 10 min: 20 max: 70
Color Table: Warm Color	<input type="checkbox"/> Set Vector size: [inch] value: skip: 1



## Graphic Options

U850

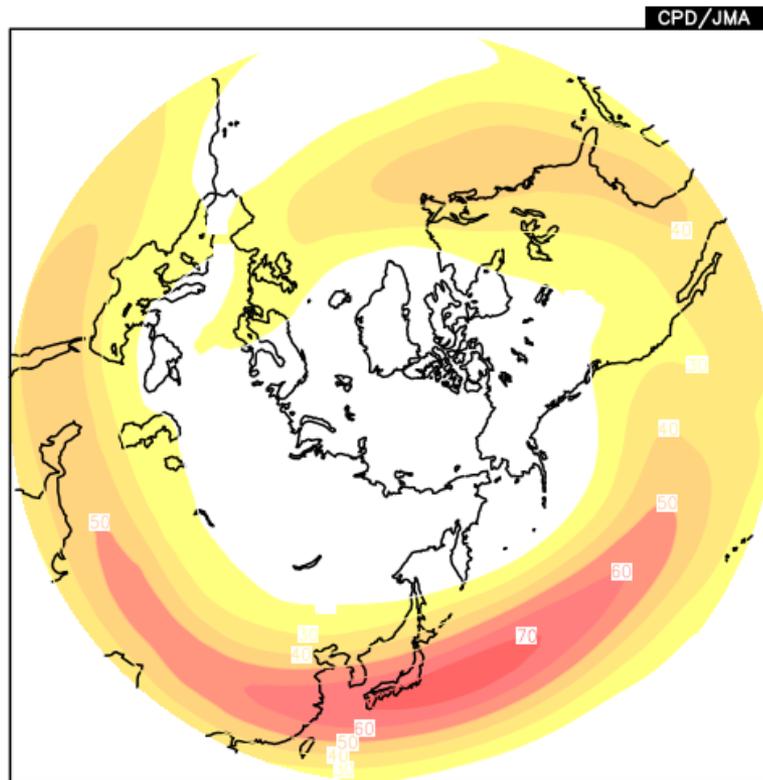
Colorizing: COLOR	<input checked="" type="checkbox"/> Show Contour Labels
Drawing: SHADE	<input checked="" type="checkbox"/> Show Color Bar
Image Format: png	<input checked="" type="checkbox"/> Set Contour Parameters for data1
Font: default	interval: 3 min: -15 max: 15
Color Table: Blue - Red	<input type="checkbox"/> Set Vector size: [inch] value: skip: 1



# Q1-9: X-Y map –Polar stereo map–

Polar stereo map is good for the extratropics.

DATA1 JRA-55 u37 HIST lat = 20:90 lon = -45:315 level = 23:23  
time = 2015120100:2016020100 ave = 3MO



Variable: U200 (hist)  
Period: December 2015  
through February 2016

# A1-9: X-Y map -Polar stereo map-

## Data 1

Dataset	Element	Data type	Area	Level	Time unit	Showing period
JRA-55	Pressure Levels U (Zonal Wind) [m/s]	HIST	ASIA Lat: 20 - 90 Lon: -45 - 315	200hPa	MONTHLY	RANGE
	<input type="checkbox"/> Vector <input type="checkbox"/> SD Derivative: <input type="checkbox"/> lon <input type="checkbox"/> lat		<input type="checkbox"/> Ave <input type="checkbox"/> Ave		<input checked="" type="checkbox"/> Ave <input type="checkbox"/> Year-to-year <input type="checkbox"/> Time filter	2015 12 2016 2

Change the area

## Graphic Options

Colorizing: COLOR	<input checked="" type="checkbox"/> Show Contour Labels	<input checked="" type="checkbox"/> Polar Stereographic: North pole	<input type="checkbox"/> No Scale Labels
Drawing: SHADE	<input checked="" type="checkbox"/> Show Color Bar	<input type="checkbox"/> Logarithmic Coordinates	<input type="checkbox"/> Draw Credit Inside
Image Format: png	<input checked="" type="checkbox"/> Set Contour Parameters for data1 interval: 10 min: 20 max: 70	<input type="checkbox"/> Reverse the Axes	<input type="checkbox"/> Apply All Pics picture size %
Font: default	<input type="checkbox"/> Set Vector size: [inch] value: skip:	<input type="checkbox"/> Flip the X-axis <input type="checkbox"/> Flip the Y-axis	<input type="checkbox"/> No Caption
Color Table: Warm Color			

Select either hemisphere.

# Q2-1: Vector

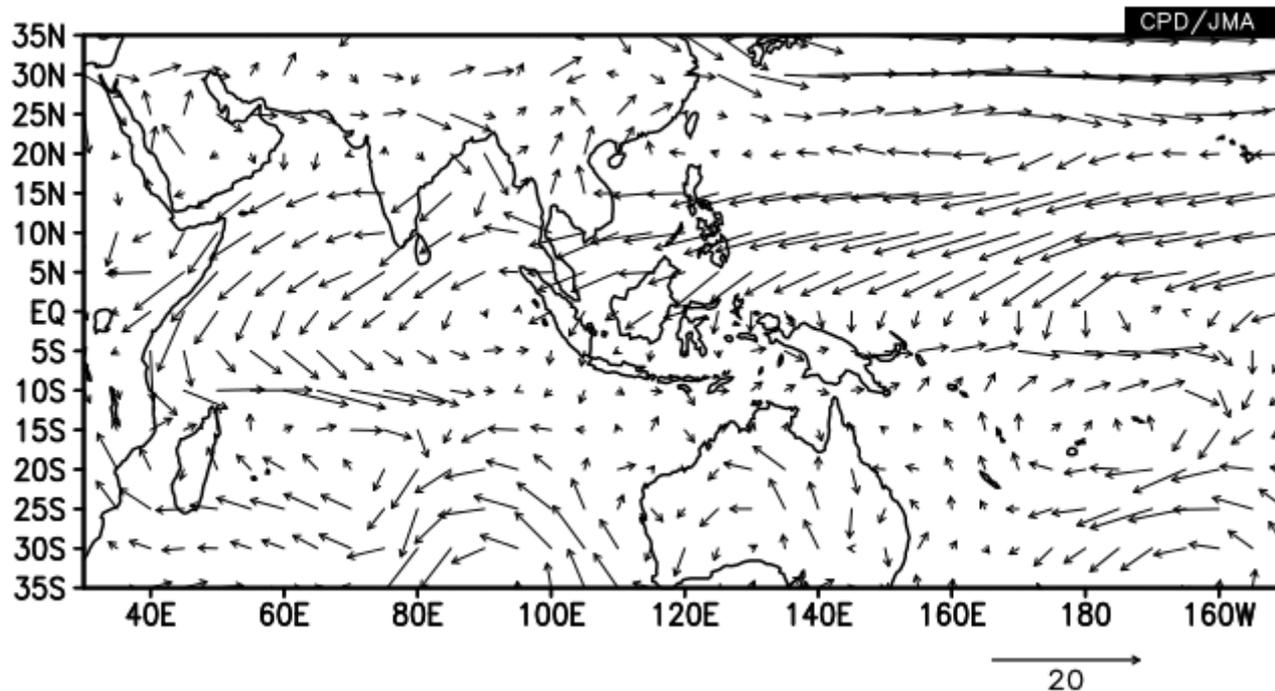
Let's see 850hPa winds in January 2016. Let the area be [35S-35N, 30E-150W].

Variable: U850, V850 (hist)

Period: January 2016

Vector: 1 inch = 20m/s, skip interval=4

DATA1 JRA-55 u37,v37 HIST lat = -35:35 lon = 30:210 level = 7:7  
time = 2016010100:2016010100 ave = 1MO



# A2-1: Vector

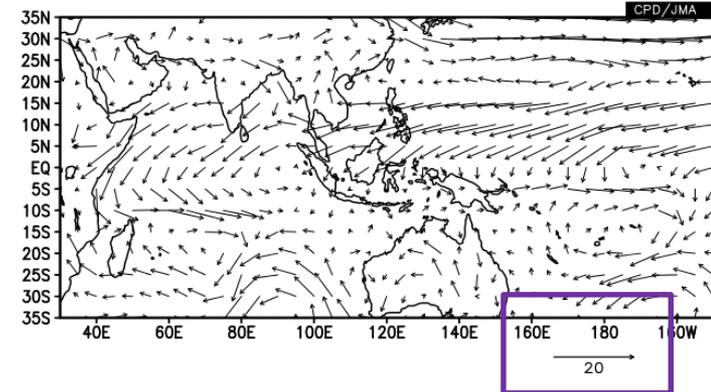
## Data 1

Dataset	Element	Data type	Area	Level	Time unit	Showing period
JRA-55	Pressure Levels U (Zonal Wind) [m/s]	HIST	ASIA Lat: -35 - 35 Ave <input type="checkbox"/> Lon: 30 - 210 Ave <input type="checkbox"/>	850hPa	MONTHLY <input type="checkbox"/> Ave <input type="checkbox"/> Year-to-year <input type="checkbox"/> Time filter	RANGE 2016 1 2016 1
	Pressure Levels V (Meridional Wind)					
	x: <input type="text"/>					
	<input checked="" type="checkbox"/> Vector <input type="checkbox"/> SD					
	Derivative: <input type="checkbox"/> lon <input type="checkbox"/> lat					

## Graphic Options

Colorizing: COLOR	<input checked="" type="checkbox"/> Show Contour Labels
Drawing: SHADE	<input checked="" type="checkbox"/> Show Color Bar
Image Format: png	<input type="checkbox"/> Set Contour Parameters for data 1
Font: default	interval: <input type="text"/> min: <input type="text"/> max: <input type="text"/>
Color Table: Rainbow	<input checked="" type="checkbox"/> Set Vector size: 1 [inch] value: 20 skip: 4

DATA1 JRA-55 u37.v37 HIST lat = -35.35 lon = 30.210 level = 7:7  
time = 2016010100:2016010100 ave = 1MO

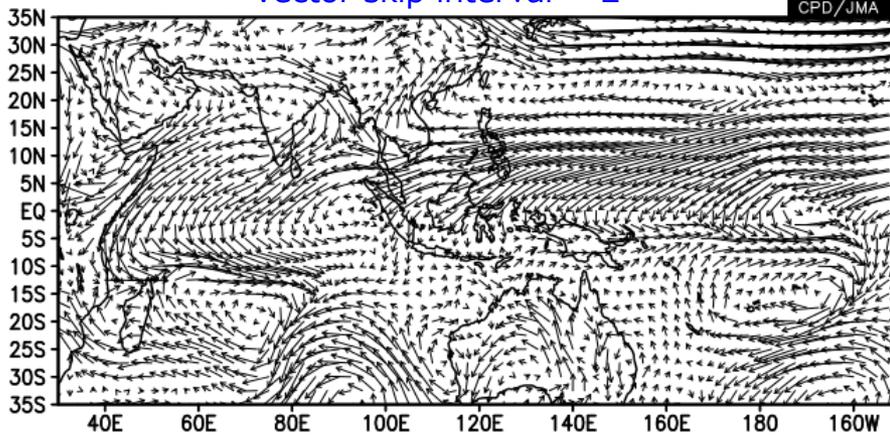


1 inch = 20 m/s

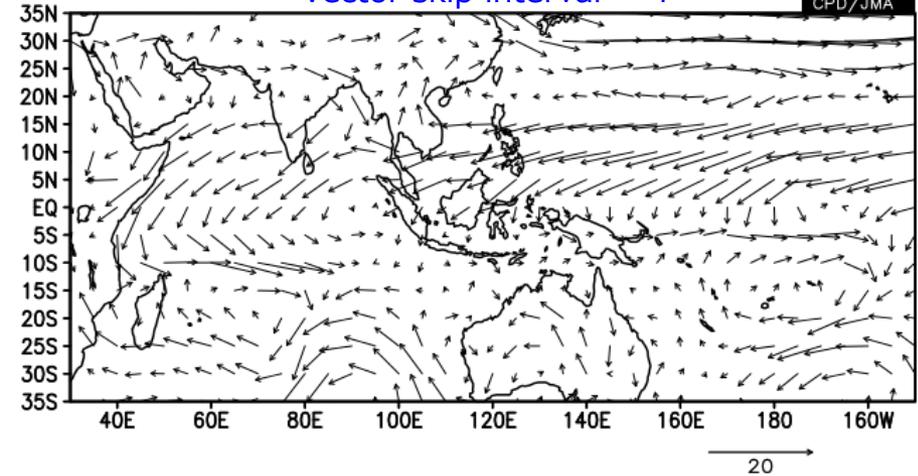
# Q2-2: Vector –skip interval–

In Q2-1, we set the vector skip interval as 4. Change this parameter as you like.

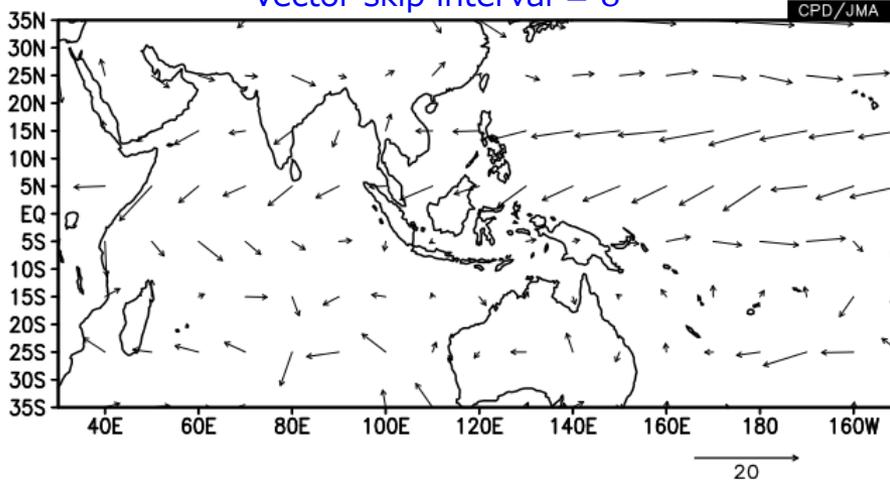
Vector skip interval = 2



Vector skip interval = 4



Vector skip interval = 8



# A2-2: Vector –skip interval–

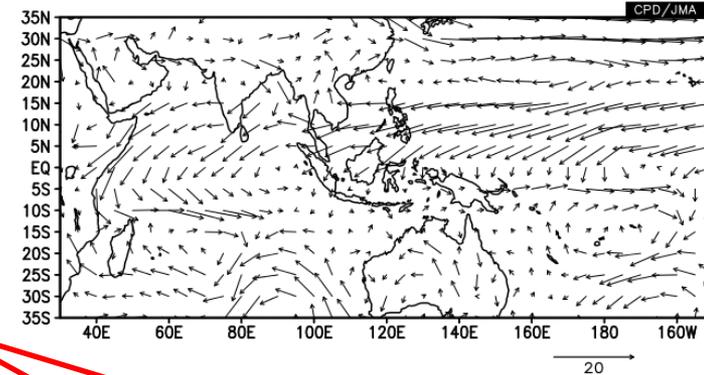
## Data 1

Dataset	Element	Data type	Area	Level	Time unit	Showing period
JRA-55	Pressure Levels U (Zonal Wind) [m/s]	HIST	ASIA Lat: -35 - 35 Ave <input type="checkbox"/> Lon: 30 - 210 Ave <input type="checkbox"/>	850hPa	MONTHLY <input type="checkbox"/> Ave <input type="checkbox"/> Year-to-year <input type="checkbox"/> Time filter	RANGE 2016 1 2016 1
	Pressure Levels V (Meridional Wind)					
	x: <input type="text"/> <input type="checkbox"/> Stream line					
	<input checked="" type="checkbox"/> Vector <input type="checkbox"/> SD					
	Derivative: <input type="checkbox"/> lon <input type="checkbox"/> lat					

## Graphic Options

Colorizing: COLOR	<input checked="" type="checkbox"/> Show Contour Labels
Drawing: SHADE	<input checked="" type="checkbox"/> Show Color Bar
Image Format: png	<input type="checkbox"/> Set Contour Parameters for data1
Font: default	interval: <input type="text"/> min: <input type="text"/> max: <input type="text"/>
Color Table: Rainbow	<input checked="" type="checkbox"/> Set Vector size: 1 [inch] value: 20 skip: 4

DATA1 JRA-55 u37.v37 HIST lat = -35.35 lon = 30.210 level = 7:7  
time = 2016010100:2016010100 ave = 1MO



Change this parameter as you like.

# Q3-1: Data1\_Data2 -Shade & Contour-

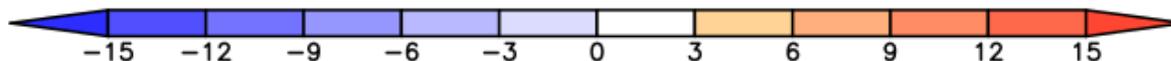
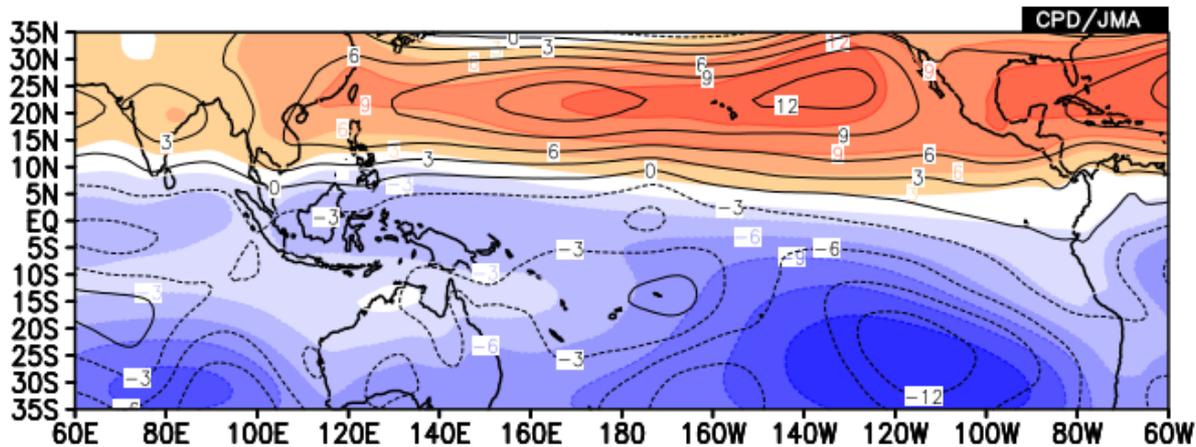
Show the stream function normal at 850hPa for January by shading and also overlay the same variable for January 2016 by contour lines.

Variable:  $\psi_{850}$

Period: January 2016

DATA1 JRA-55 psi37 NORM lat = -35:35 lon = 60:300 level = 7:7  
time = 2016010100:2016010100 ave = 1MO

DATA2 JRA-55 psi37 HIST lat = -35:35 lon = 60:300 level = 7:7  
time = 2016010100:2016010100 ave = 1MO analysis method = DATA1\_DATA2



# A3-1:Data1\_Data2 -Shade & Contour-

## Data1

Dataset	Element	Data type	Area	Level	Time unit	Showing period
JRA-55	Pressure Levels $\psi$ (Stream Function) [	NORM	ALL Lat: -35 - 35 Ave <input type="checkbox"/> Lon: 60 - 300 Ave <input type="checkbox"/>	850hPa	MONTHLY <input type="checkbox"/> Ave <input type="checkbox"/> Year-to-year <input type="checkbox"/> Time filter	RANGE 2016 1 2016 1

Vector  SD  
Derivative:  lon  lat

Analysis method: DATA1\_DATA2

## Data2

Dataset	Element	Data type	Area	Level	Time unit	Showing period
JRA-55	Pressure Levels $\psi$ (Stream Function) [	HIST	ALL Lat: -35 - 35 Ave <input type="checkbox"/> Lon: 60 - 300 Ave <input type="checkbox"/>	850hPa	MONTHLY <input type="checkbox"/> Ave <input type="checkbox"/> Year-to-year <input type="checkbox"/> Time filter	RANGE 2016 1 2016 1

SD

Basic Rule  
Data1: Shading, Data2: Contour

## Graphic Options

Colorizing: COLOR	<input checked="" type="checkbox"/> Show Contour Labels
Drawing: SHADE	<input checked="" type="checkbox"/> Show Color Bar
Image Format: png	<input checked="" type="checkbox"/> Set Contour Parameters for data1
Font: default	interval: 3 min: -15 max: 15
Color Table: Blue - Red	<input checked="" type="checkbox"/> Set Contour Parameters for data2
	interval: 3 min: -15 max: 15
	<input type="checkbox"/> Set Vector size: [ ] [inch] value: [ ] skip: 1

Detailed Options for Image 1

For Image 1 Upper layer apply apply Default

About Graphics

contour Style: default Color: black

To change the contour color, please check detailed options box and set the contour color black for Upper layer.

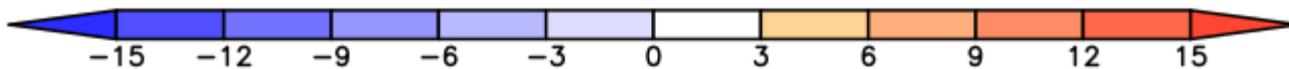
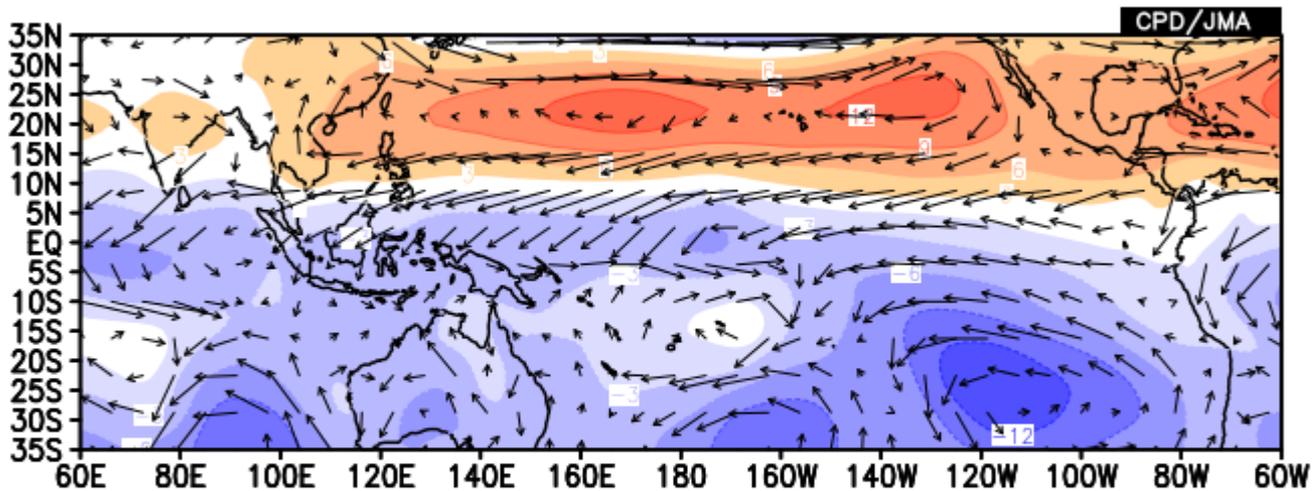
# Q3-2: Data1\_Data2 -Shade & Vector-

Next, show the wind vectors and stream function at 850hPa for January 2016.

Variable: U850, V850,  $\psi$ 850  
Period: January 2016

DATA1 JRA-55 u37,v37 HIST lat = -35:35 lon = 60:300 level = 7:7  
time = 2016010100:2016010100 ave = 1MO

DATA2 JRA-55 psi37 HIST lat = -35:35 lon = 60:300 level = 7:7  
time = 2016010100:2016010100 ave = 1MO analysis method = DATA1\_DATA2



# A3-2:Data1\_Data2 -Shade & Vector-

## Data1

Dataset	Element	Data type	Area	Level	Time unit	Showing period
JRA-55	Pressure Levels U (Zonal Wind) [m/s]	HIST	ALL Lat: -35 - 35 Ave <input type="checkbox"/> Lon: 60 - 300 Ave <input type="checkbox"/>	850hPa	MONTHLY <input type="checkbox"/> Ave <input type="checkbox"/> Year-to-year <input type="checkbox"/> Time filter	RANGE 2016 1 2016 1
	Pressure Levels V (Meridional Wind) [r]					
	x: <input type="text"/> <input type="checkbox"/> Stream line <input checked="" type="checkbox"/> Vector <input type="checkbox"/> SD Derivative: <input type="checkbox"/> lon <input type="checkbox"/> lat					

Analysis method: DATA1 DATA2

An important Exception:  
Vector must be set as Data1.

## Data2

Dataset	Element	Data type	Area	Level	Time unit	Showing period
JRA-55	Pressure Levels $\psi$ (Stream Function) [°]	HIST	ALL Lat: -35 - 35 Ave <input type="checkbox"/> Lon: 60 - 300 Ave <input type="checkbox"/>	850hPa	MONTHLY <input type="checkbox"/> Ave <input type="checkbox"/> Year-to-year <input type="checkbox"/> Time filter	RANGE 2016 1 2016 1
	<input type="checkbox"/> SD					

## Graphic Options

Colorizing: COLOR	<input checked="" type="checkbox"/> Show Contour Labels
Drawing: SHADE	<input checked="" type="checkbox"/> Show Color Bar
Image Format: png	<input type="checkbox"/> Set Contour Parameters for data1
Font: default	interval: <input type="text"/> min: <input type="text"/> max: <input type="text"/>
Color Table: Blue - Red	<input checked="" type="checkbox"/> Set Contour Parameters for data2
	interval: 3 min: -15 max: 15
	<input checked="" type="checkbox"/> Set Vector size: 1 [inch] value: 20 skip: 5

Set graphic options as you like. This is just an example.

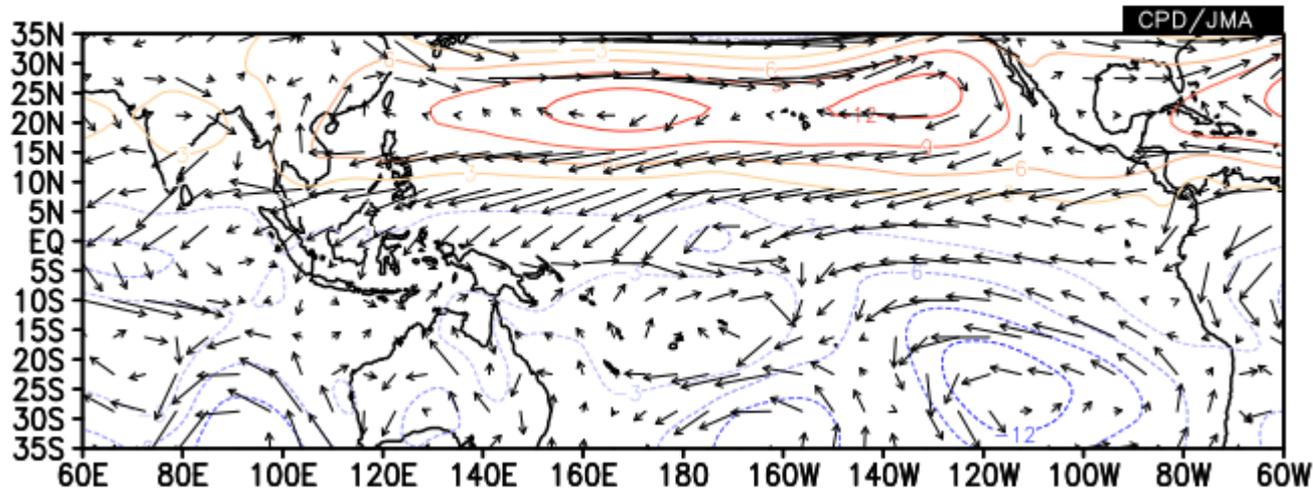
# Q3-3: Data1\_Data2 -Contour & Vector-

Draw the stream function by contour lines.

Variable: U850, V850,  $\psi$ 850  
Period: January 2016

DATA1 JRA-55 u37,v37 HIST lat = -35:35 lon = 60:300 level = 7:7  
time = 2016010100:2016010100 ave = 1MO

DATA2 JRA-55 psi37 HIST lat = -35:35 lon = 60:300 level = 7:7  
time = 2016010100:2016010100 ave = 1MO analysis method = DATA1\_DATA2



# A3-3:Data1\_Data2 -Contour & Vector-

## Data1

Dataset	Element	Data type	Area	Level	Time unit	Showing period
JRA-55	Pressure Levels U (Zonal Wind) [m/s]	HIST	ALL Lat: -35 - 35 Ave <input type="checkbox"/> Lon: 60 - 300 Ave <input type="checkbox"/>	850hPa	MONTHLY <input type="checkbox"/> Ave <input type="checkbox"/> Year-to-year <input type="checkbox"/> Time filter	RANGE 2016 1 2016 1
	Pressure Levels V (Meridional Wind) [r]					
	x: <input type="text"/> <input type="checkbox"/> Stream line <input checked="" type="checkbox"/> Vector <input type="checkbox"/> SD Derivative: <input type="checkbox"/> lon <input type="checkbox"/> lat					

Analysis method: DATA1 DATA2

## Data2

Dataset	Element	Data type	Area	Level	Time unit	Showing period
JRA-55	Pressure Levels $\psi$ (Stream Function) [ ]	HIST	ALL Lat: -35 - 35 Ave <input type="checkbox"/> Lon: 60 - 300 Ave <input type="checkbox"/>	850hPa	MONTHLY <input type="checkbox"/> Ave <input type="checkbox"/> Year-to-year <input type="checkbox"/> Time filter	RANGE 2016 1 2016 1
	<input type="checkbox"/> SD					

## Graphic Options

Colorizing: COLOR	<input checked="" type="checkbox"/> Show Contour Labels
Drawing: CONTOUR	<input checked="" type="checkbox"/> Show Color Bar
Image Format: png	<input type="checkbox"/> Set Contour Parameters for data1 interval: <input type="text"/> min: <input type="text"/> max: <input type="text"/>
Font: default	<input checked="" type="checkbox"/> Set Contour Parameters for data2 interval: 3 min: -15 max: 15
Color Table: Blue - Red	<input checked="" type="checkbox"/> Set Vector size: 1 [inch] value: 20 skip: 5

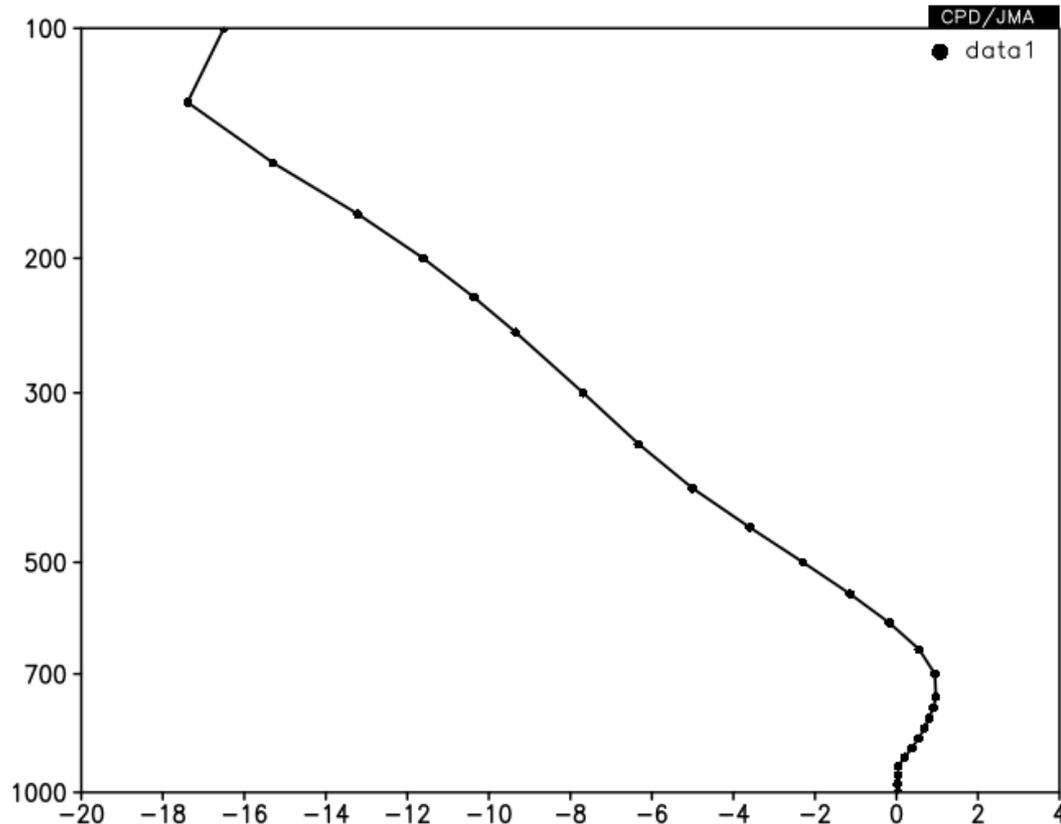
Difference is just one point, here.  
Please select "CONTOUR" in this  
Drawing option box.

# Q4-1:1D chart –vertical profile–

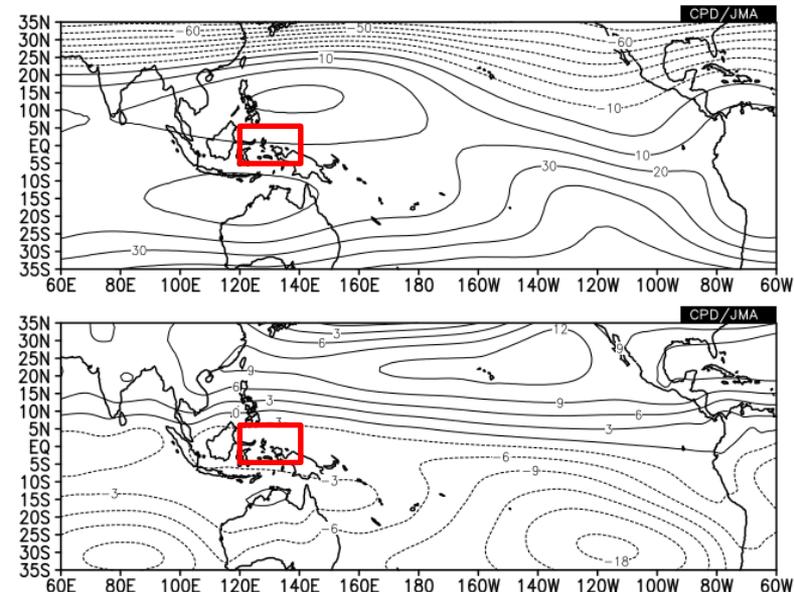
Show the vertical profile of climatological mean zonal winds averaged over the area [5S-5N, 120E-140E] for January.

Variable: U  
Period: January

DATA1 JRA-55 u37 NORM lat = -5:5 lon = 120:140 level = 1:27  
time = 2016010100:2016010100 ave = 1MO



cf:  $\psi_{200}$  (upper panel) and 850 (below panel) normals. Red box is the target area.



# A4-1:1D chart –vertical profile–

## Data1

Dataset	Element	Data type	Area	Level	Time unit	Showing period
JRA-55	Pressure Levels U (Zonal Wind) [m/s]	NORM	ALL	1000hPa 100hPa	MONTHLY <input type="checkbox"/> Ave <input type="checkbox"/> Year-to-year <input type="checkbox"/> Time filter	RANGE 2016 1 2016 1

Vector  SD  
Derivative:  lon  lat

Lat: -5 - 5 Ave   
Lon: 120 - 140 Ave

Taking average means fixing the correspond dimensions.

## Graphic Options

Colorizing: COLOR	<input checked="" type="checkbox"/> Show Contour Labels	<input type="checkbox"/> Polar Stereographic: North pole	<input type="checkbox"/> No Scale Labels
Drawing: SHADE	<input checked="" type="checkbox"/> Show Color Bar	<input checked="" type="checkbox"/> Logarithmic Coordinates	<input type="checkbox"/> Draw Credit Inside
Image Format: png	<input type="checkbox"/> Set Contour Parameters for data1	<input type="checkbox"/> Reverse the Axes	<input type="checkbox"/> Apply All Pics
Font: default	interval: min: max:	<input type="checkbox"/> Flip the X-axis <input type="checkbox"/> Flip the Y-axis	picture size %
Color Table: Blue - Red	<input type="checkbox"/> Set Vector size: [inch] value: skip:	<input type="checkbox"/> No Caption	

Logarithmic coordinate should be appropriate for drawing vertical profiles with pressure-level data.

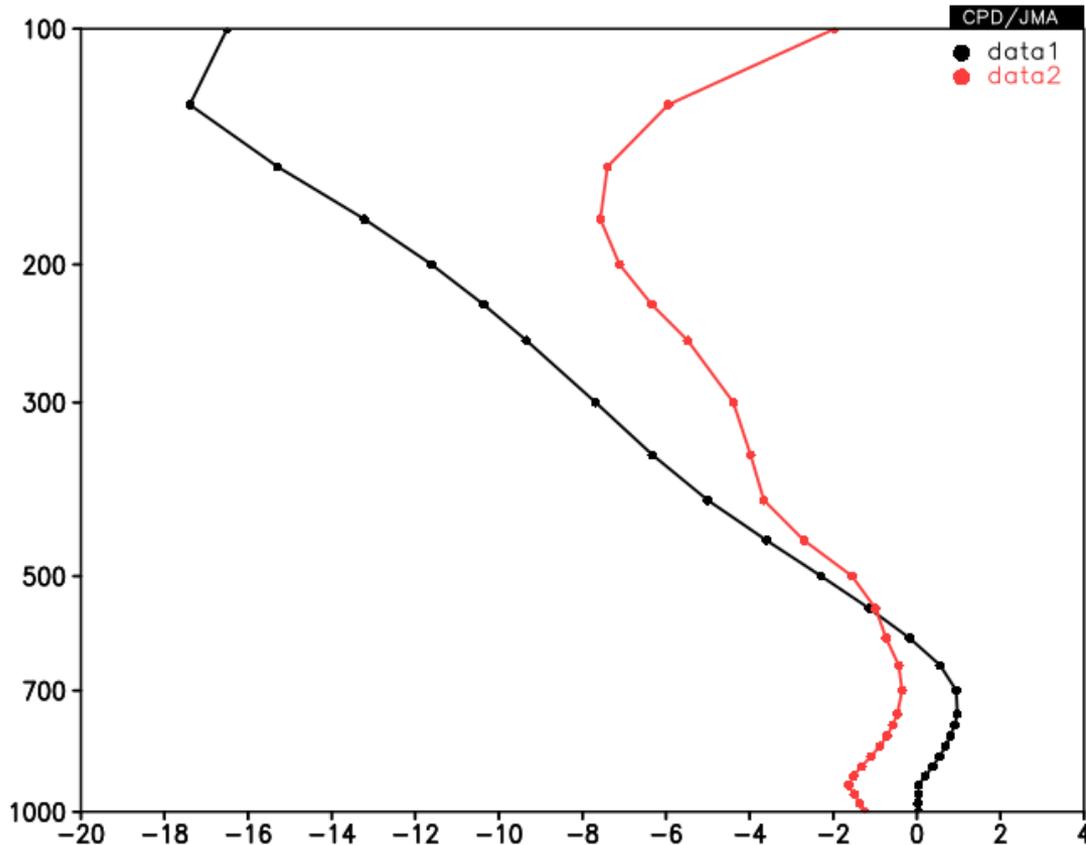
Detailed Options for Image 1

# Q4-2:1D chart –vertical profile-

Next, also overlay the same profile but for January 2016 by the red line.

```
DATA1 JRA-55 u37 NORM lat = -5:5 lon = 120:140 level = 1:27  
time = 2016010100:2016010100 ave = 1MO  
DATA2 JRA-55 u37 HIST lat = -5:5 lon = 120:140 level = 1:27  
time = 2016010100:2016010100 ave = 1MO analysis method = DATA1_DATA2
```

Variable: U  
Period: January



# A4-2:1D chart –vertical profile–

## Data1

Dataset	Element	Data type	Area	Level	Time unit	Showing period
JRA-55	Pressure Levels U (Zonal Wind) [m/s]	NORM	ALL Lat: -5 - 5 Ave <input checked="" type="checkbox"/> Lon: 120 - 140 Ave <input checked="" type="checkbox"/>	1000hPa 100hPa	MONTHLY <input type="checkbox"/> Ave <input type="checkbox"/> Year-to-year <input type="checkbox"/> Time filter	RANGE 2016 1 2016 1

Vector  SD  
Derivative:  lon  lat

Analysis method: DATA1\_DATA2

## Data2

Dataset	Element	Data type	Area	Level	Time unit	Showing period
JRA-55	Pressure Levels U (Zonal Wind) [m/s]	HIST	ALL Lat: -5 - 5 Ave <input checked="" type="checkbox"/> Lon: 120 - 140 Ave <input checked="" type="checkbox"/>	1000hPa 100hPa	MONTHLY <input type="checkbox"/> Ave <input type="checkbox"/> Year-to-year <input type="checkbox"/> Time filter	RANGE 2016 1 2016 1

SD

Detailed Options for Image 1

For Image 1 Upper layer

### About Graphics

contour Style: default Color: black  
label  format: thickness: 1 size: 0.09 skip interval:  
contour line thickness: 3  
levels: color:  
thin contour:   
not to draw: -

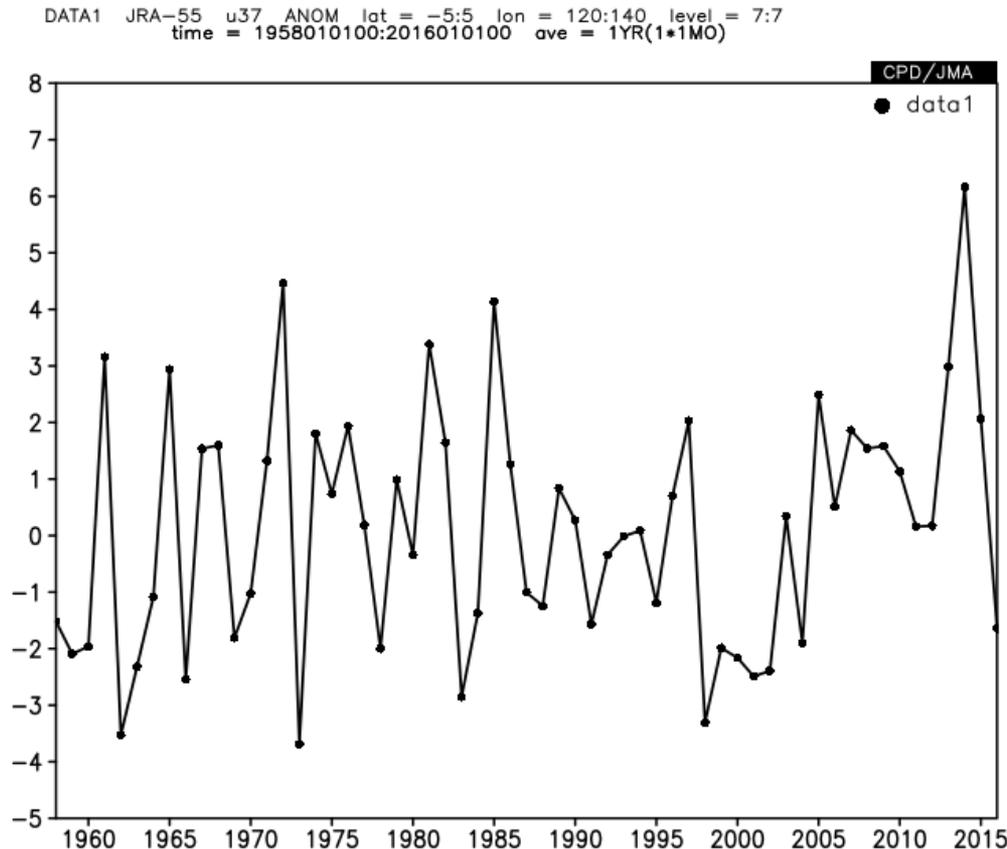
marker type: closed circles  
line style: solid color: red thickness: 6  
grid style: none color: white

You can change line's color by modifying this graphic option. It also should be noted that Data2 is drawn on the Upper layer.

# Q4-3:1D chart –time series-

Show the time series of zonal wind anomalies at 850hPa for January averaged over the same region as Q4-1 and 2. Let the showing period be from 1958 to 2016.

Variable: U850  
Period: January (1958-2016)



# A4-3:1D chart –time series–

## Data1

Dataset	Element	Data type	Area	Level	Time unit	Showing period
JRA-55	Pressure Levels U (Zonal Wind) [m/s]	ANOM	ALL Lat: -5 -5 Ave <input checked="" type="checkbox"/> Lon: 120 -140 Ave <input checked="" type="checkbox"/>	850hPa 850hPa	MONTHLY <input type="checkbox"/> Ave <input checked="" type="checkbox"/> Year-to-year <input type="checkbox"/> Time filter	RANGE 1958 - 2016 1 - 1

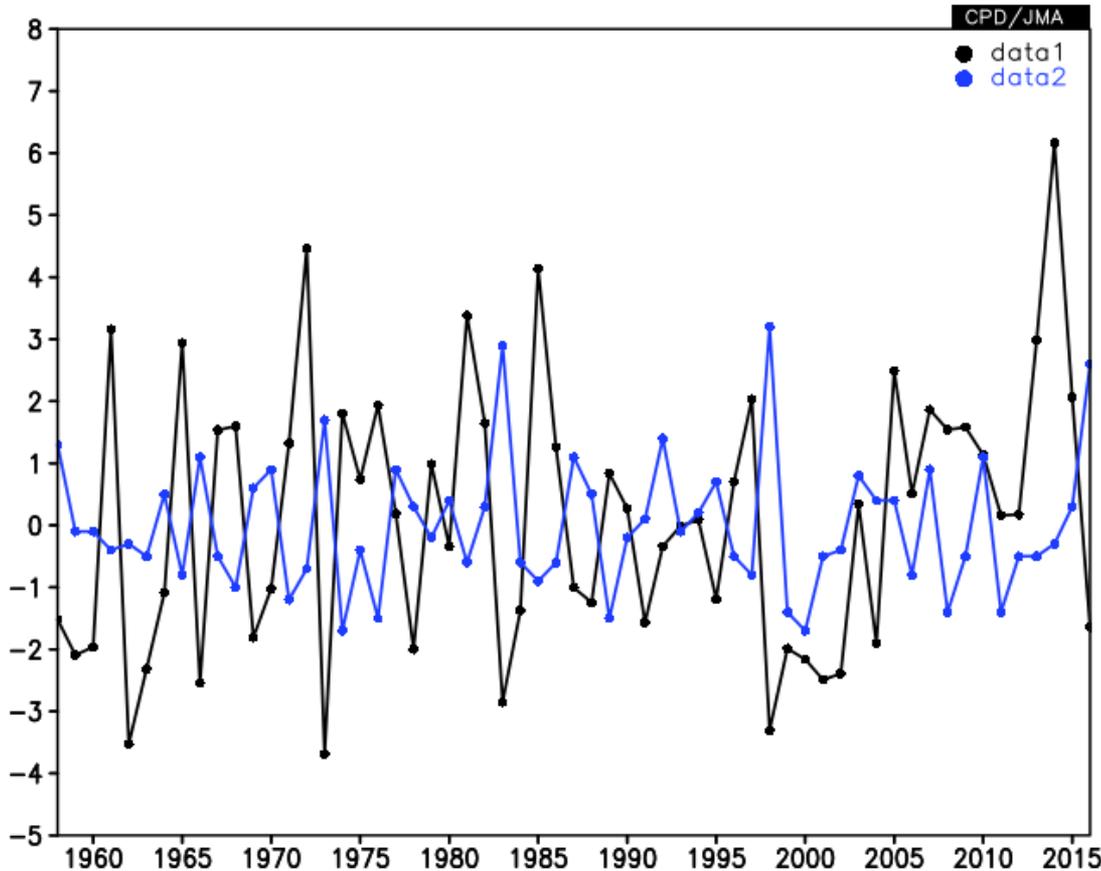
Vector  SD  
Derivative:  lon  lat

Remember that “Year-to-year” means picking up particular month(s) from each year.

# Q4-4: 1D chart –time series–

Overlay the NINO.3 SST index anoamlies by dark-blue line.

```
DATA1 JRA-55 u37 ANOM lat = -5:5 lon = 120:140 level = 7:7  
time = 1958010100:2016010100 ave = 1YR(1*1MO)  
  
DATA2 INDEX nino.3 ANOM lat = -5:5 lon = 120:140 level = 1:1  
time = 1958010100:2016010100 ave = 1YR(1*1MO) analysis method = DATA1_DATA2
```



Variable: U850, NINO.3  
Period: January (1958-2016)

.....Can you find any relationship between them?

# A4-4:1D chart –time series–

## Data1

Dataset	Element	Data type	Area	Level	Time unit	Showing period
JRA-55	Pressure Levels U (Zonal Wind) [m/s]	ANOM	ALL Lat: -5 - 5 Ave <input checked="" type="checkbox"/> Lon: 120 - 140 Ave <input checked="" type="checkbox"/>	850hPa 850hPa	MONTHLY <input type="checkbox"/> Ave <input checked="" type="checkbox"/> Year-to-year <input type="checkbox"/> Time filter	RANGE 958 - 2016 1 - 1

Vector  SD  
Derivative:  lon  lat

Analysis method: DATA1\_DATA2

## Data2

Dataset	Element	Data type	Time unit	Showing period
INDEX	NINO.3	ANOM	MONTHLY <input type="checkbox"/> Ave <input checked="" type="checkbox"/> Year-to-year <input type="checkbox"/> Time filter	RANGE 1958 - 2016 1 - 1

Detailed Options for Image 1

For Image 1 Upper layer

### About Graphics

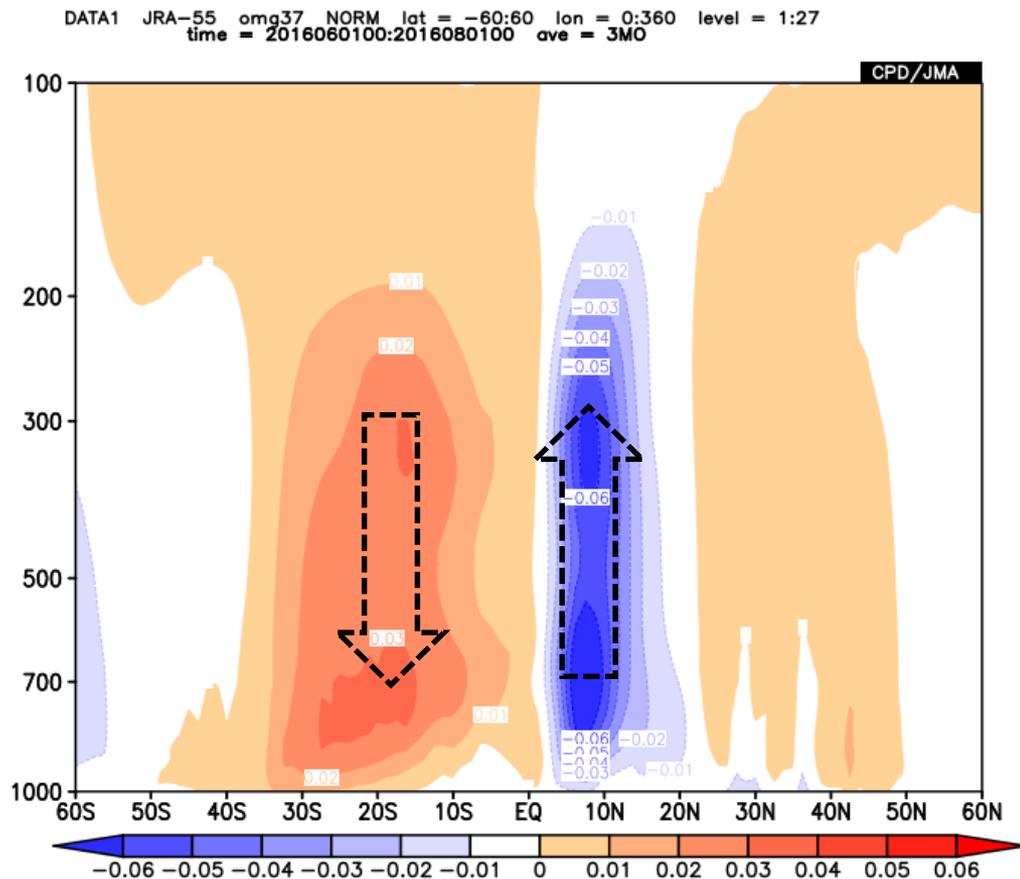
contour Style: default Color: black  
label  format: thickness: 1 size: 0.09  
contour line thickness: 3  
levels: color:  
thin contour:   
not to draw: -  
marker type: closed circle  
line style: solid color: dark-blue thickness: 6  
grid style: none color: white

Remember that you can change the line's color by modifying this parameter.

# Q5-1: Cross Section –zonal mean–

Show the climatology of latitude-height section of zonal mean\* omega (pressure velocity) for June-July-August.

\*zonal mean: Taking an average along a latitudinal circle



Variable: omega  
Period: June-July-August

Note:  
Omega is defined as

$$\omega \equiv dp/dt.$$

A negative omega, namely the pressure value becoming smaller, means there is an upward motion because pressure becomes smaller towards upper levels in general.

# A5-1: Cross Section –zonal mean–

## Data1

Dataset	Element	Data type	Area	Level	Time unit	Showing period
JRA-55	Pressure Levels	NORM	ALL	1000hPa	MONTHLY	RANGE
	$\omega$ (Pressure Vertical V		Lat: -60 - 60 Ave <input type="checkbox"/>	100hPa	<input checked="" type="checkbox"/> Ave <input type="checkbox"/> Year-to-year	2016 6
			Lon: 0 - 360 Ave <input checked="" type="checkbox"/>		<input type="checkbox"/> Time filter	2016 8

Vector  SD  
Derivative:  lon  lat

Don't forget to check this average box.

Taking average along a latitudinal circle.

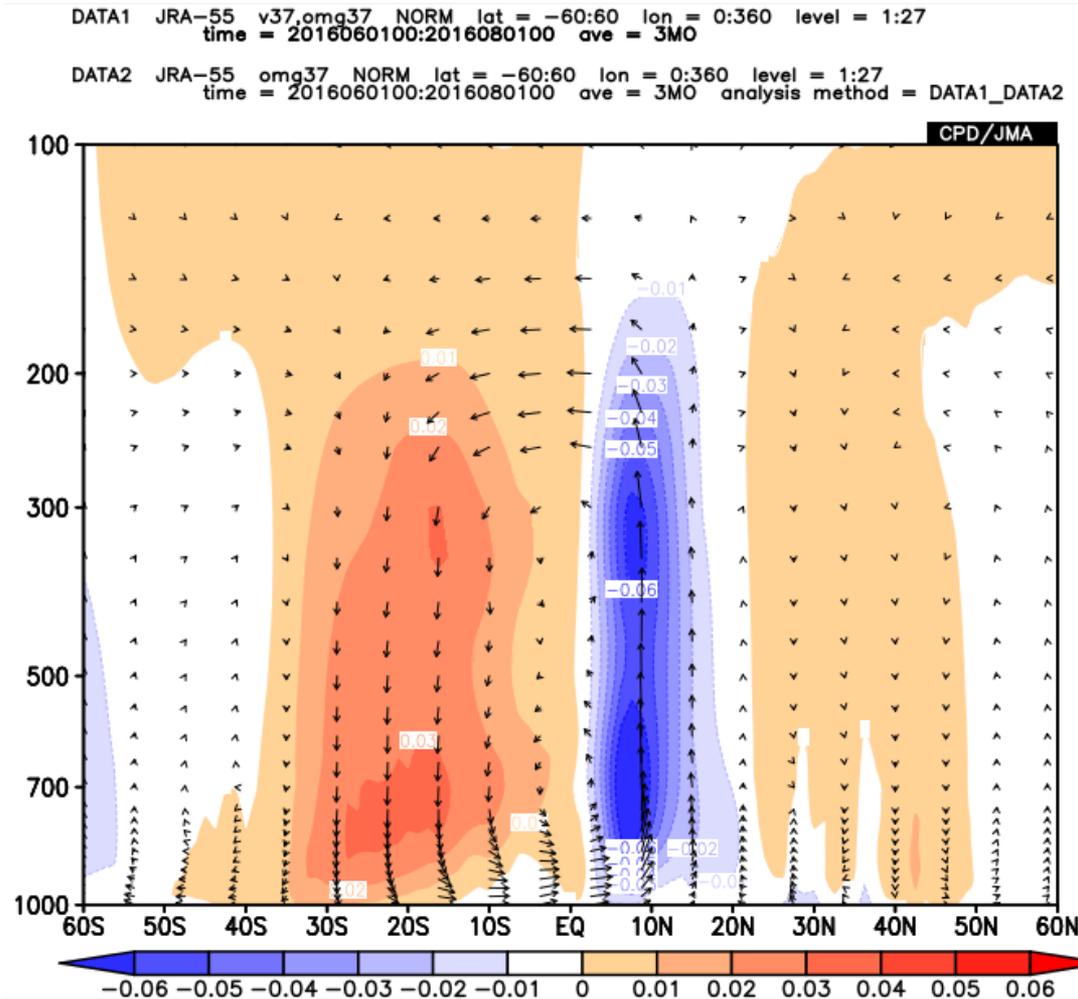
## Graphic Options

Colorizing: COLOR	<input checked="" type="checkbox"/> Show Contour Labels	<input type="checkbox"/> Polar Stereographic: North pole
Drawing: SHADE	<input checked="" type="checkbox"/> Show Color Bar	<input checked="" type="checkbox"/> Logarithmic Coordinates
Image Format: png	<input checked="" type="checkbox"/> Set Contour Parameters for data1	<input type="checkbox"/> Reverse the Axes
Font: default	interval: 0.01 min: -0.06 max: 0.06	<input type="checkbox"/> Flip the X-axis <input type="checkbox"/> Flip the Y-axis
Color Table: Blue - Red	<input type="checkbox"/> Set Vector size: [ ] [inch] value: [ ] skip: [ ]	<input type="checkbox"/> No Caption

Logarithmic coordinate should be appropriate for drawing vertical profiles with pressure-level data.

# Q5-2: Cross Section –zonal mean–

Overlay wind vectors, namely meridional winds and vertical winds.



# A5-2: Cross Section –zonal mean–

## Data1

Please remember vector must be as Data1.

Dataset	Element	Data type	Area	Level	Time unit	Showing period
JRA-55	Pressure Levels V (Meridional Wind) [r]	NORM	ALL	1000hPa 100hPa	MONTHLY	RANGE
	Pressure Levels $\omega$ (Pressure Vertical V)		Lat: -60 - 60 Ave <input type="checkbox"/>		<input checked="" type="checkbox"/> Ave <input type="checkbox"/> Year-to-year	2016 6
	x: -100		Lon: 0 - 360 Ave <input checked="" type="checkbox"/>		<input type="checkbox"/> Time filter	2016 8
	<input checked="" type="checkbox"/> Vector <input type="checkbox"/> SD					
	Derivative: <input type="checkbox"/> lon <input type="checkbox"/> lat					

This means multiplying the second component by -100. There is two reason.  
#1: To reverse the vector direction for understanding the true wind direction intuitively. Remember the negative omega means descent motion.  
#2: To highlight vertical component because omega values are too small compared to meridional wind in general.

Analysis method: DATA1 DATA2

## Data2

Dataset	Element	Data type	Area	Level	Time unit	Showing period
JRA-55	Pressure Levels $\omega$ (Pressure Vertical V)	NORM	ALL	1000hPa 100hPa	MONTHLY	RANGE
			Lat: -60 - 60 Ave <input type="checkbox"/>		<input checked="" type="checkbox"/> Ave <input type="checkbox"/> Year-to-year	2016 6
			Lon: 0 - 360 Ave <input checked="" type="checkbox"/>		<input type="checkbox"/> Time filter	2016 8
	<input type="checkbox"/> SD					

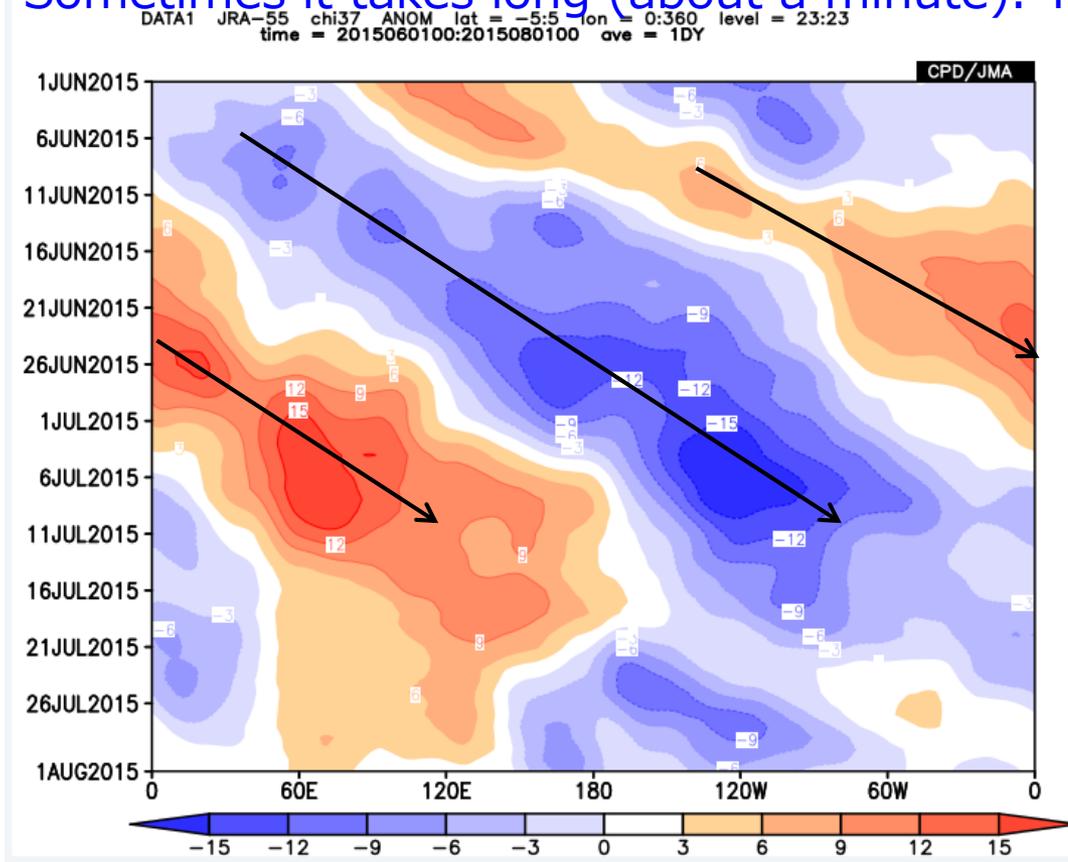
## Graphic Options

Colorizing: COLOR	<input checked="" type="checkbox"/> Show Contour Labels	<input type="checkbox"/> Polar Stereographic: North pole
Drawing: SHADE	<input checked="" type="checkbox"/> Show Color Bar	<input checked="" type="checkbox"/> Logarithmic Coordinates
Image Format: png	<input checked="" type="checkbox"/> Set Contour Parameters for data1	<input type="checkbox"/> Reverse the Axes
Font: default	interval: 0.01 min: -0.06 max: 0.06	<input type="checkbox"/> Flip the X-axis <input type="checkbox"/> Flip the Y-axis
Color Table: Blue - Red	<input type="checkbox"/> Set Vector size: [ ] [inch] value: [ ] skip: [ ]	<input type="checkbox"/> No Caption

# Q5-3: Cross Section –Hovmöller diagram–

Show the longitude-time cross section of 7-day running mean vector potential anomalies at 200hPa along the equator (namely, 5S-5N average) from 1<sup>st</sup> Jun through 1<sup>st</sup> August 2015.

\*Sometimes it takes long (about a minute). Thank you for your patience.



Variable: chi200

Period: 1 June 2015 to  
1 August 2015

\*This kind of map is called as a Hovmöller diagram. You can see some eastward wave propagation events in this map. Actually, they corresponds to Madden-Julian Oscillation (MJO).

# Q5-3: Cross Section –Hovmöller diagram–

## Data1

Dataset	Element	Data type	Area	Level	Time unit	Showing period
JRA-55	Pressure Levels χ (Velocity Potential) [	ANOM	ALL Lat: -5 - 5 Ave <input checked="" type="checkbox"/> Lon: 0 - 360 Ave <input type="checkbox"/>	200hPa 200hPa	DAILY <input type="checkbox"/> Ave <input type="checkbox"/> Year-to-year	RANGE 2015 6 1 2015 8 1
<input type="checkbox"/> Vector <input type="checkbox"/> SD Derivative: <input type="checkbox"/> lon <input type="checkbox"/> lat				<input checked="" type="checkbox"/> Time filter Running mean mean period 7		

You can take running mean by checking this time filter box, then selecting "Running mean" and setting mean period. In this case, 7 is set. Since the time unit is daily, this means 7-day running mean.

## Graphic Options

Colorizing: COLOR	<input checked="" type="checkbox"/> Show Contour Labels
Drawing: SHADE	<input checked="" type="checkbox"/> Show Color Bar
Image Format: png	<input checked="" type="checkbox"/> Set Contour Parameters for data1
Font: default	interval: 3 min: -15 max: 15
Color Table: Blue - Red	<input type="checkbox"/> Set Vector size: [ ] [inch] value: [ ] skip: [ ]