



Some IRIDL examples

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S2S Prediction Project

Many thanks to Andy W. Robertson, Mike Bell, Jing Yuan, Rémi Cousin



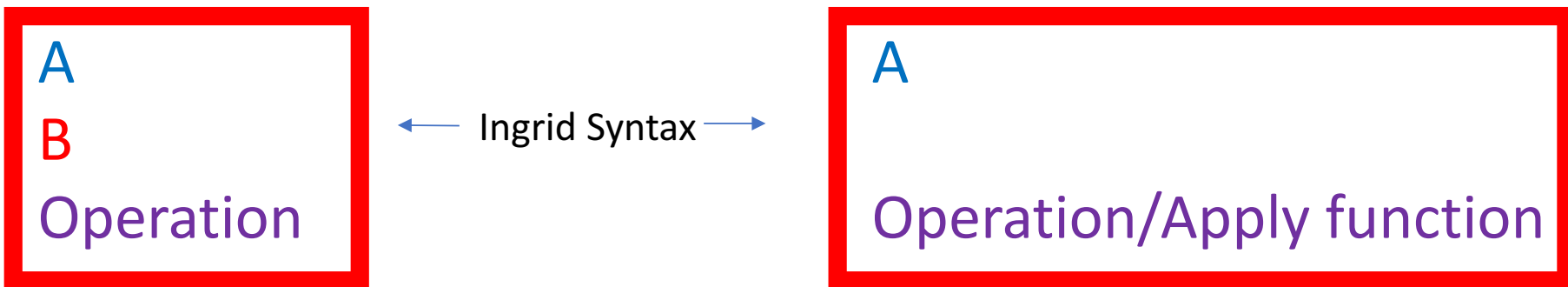
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International Research Institute
for Climate and Society
EARTH INSTITUTE | COLUMBIA UNIVERSITY





1. Build MJO composites of stream function
2. Explore the possibility of using other variables in the reanalysis
3. Customizing: variable name, units, color bar, ...
4. Computing MJO composites for different lead times: rainfall and stream function
5. MJO composites using model data (for the sake of simplicity: CFSv2)



To produce composites:

Daily Streamfunction
Daily MJO phase & amplitude
Classify
Select season & compute seasonal average

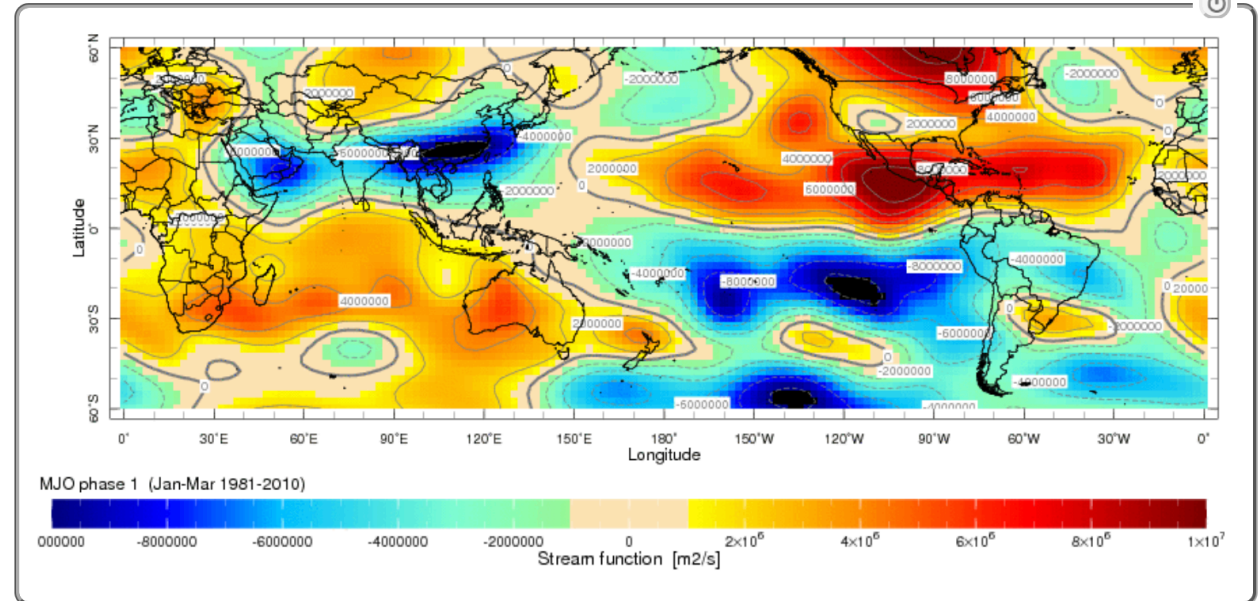
Subtract long-term mean to produce anomalies

Plot

var:

Description Expert Mode Options Instructions

```
SOURCES .NOAA .NCEP-NCAR .CDAS-1 .DAILY .Intrinsic .PressureLevel
a: (.psi)
/var parameter
interp
:a
T (julian_day) streamgridunitconvert
P (200) VALUES
P removeGRID
T (1 Jan 1981) (31 Dec 2010) RANGE
X 0 360 RANGE
Y -60 60 RANGE
(http://datoteca.ole2.org/SOURCES/.BoM/.MJO/.phase_frozen/dods) readdods .phase
T (1 Jan 1981) (31 Dec 2010) RANGE
(http://datoteca.ole2.org/SOURCES/.BoM/.MJO/.amplitude_frozen/dods) readdods .amplitude
T (1 Jan 1981) (31 Dec 2010) RANGE
1.0 flaggt
mul
/name /phase def
classifyby
T (Jan)
/seasonStart parameter
(-) append
(Mar)
/seasonEnd parameter
append
seasonalAverage
[T]average
SOURCES .NOAA .NCEP-NCAR .CDAS-1 .DAILY .Intrinsic .PressureLevel
a: (.psi)
/var parameter
interp
:a
T (julian_day) streamgridunitconvert
P (200) VALUES
P removeGRID
T (1 Jan 1981) (31 Dec 2010) RANGE
X 0 360 RANGE
Y -60 60 RANGE
T (Jan)
/seasonStart parameter
(-) append
(Mar)
/seasonEnd parameter
append
seasonalAverage
[T]average
sub
a- -a correlationcolorscale
/long_name (Stream function ) def
/units (m2/s) def
X Y fig- colors |
thin grey contours black thin solid coasts countries -fig
/antialias true psdef
/plotaxislength 700 psdef
/adif -1.0000000E07 1.0000000E07 plotrange
/phase 1.0 plotvalue
/Y -60 60 plotrange
/XOYV null psdef
```



<http://bit.ly/2l8yZhC>



```
SOURCES .NOAA .NCEP-NCAR .CDAS-1 .DAILY .Intrinsic .PressureLevel
```

```
a: (.psi)
```

```
/var parameter
```

```
interp
```

```
:a
```

```
T (julian_day) streamgridunitconvert
```

```
P (200) VALUES
```

```
P removeGRID
```

```
T (1 Jan 1981) (31 Dec 2010) RANGE
```

```
X 0 360 RANGE
```

```
Y -60 60 RANGE
```

```
(http://datoteca.ole2.org/SOURCES/.BoM/.MJO/.phase\_frozen/dods) readdods .phase
```

```
T (1 Jan 1981) (31 Dec 2010) RANGE
```

```
(http://datoteca.ole2.org/SOURCES/.BoM/.MJO/.amplitude\_frozen/dods) readdods .amplitude
```

```
T (1 Jan 1981) (31 Dec 2010) RANGE
```

```
1.0 flaggt mul
```

```
/name /phase def
```

```
classifyby
```

Remember!

Daily Streamfunction

Daily MJO phase & amplitude

Classify





SOURCES .NOAA .NCEP-NCAR .CDAS-1 .DAILY .Intrinsic .PressureLevel

a: (.psi)

/var parameter

interp

:a

T (julian_day) streamgridunitconvert

P (200) VALUES

P removeGRID

T (1 Jan 1981) (31 Dec 2010) RANGE

X 0 360 RANGE

Y -60 60 RANGE

(http://datoteca.ole2.org/SOURCES/.BoM/.MJO/.phase_frozen/dods) readdods .phase

T (1 Jan 1981) (31 Dec 2010) RANGE

(http://datoteca.ole2.org/SOURCES/.BoM/.MJO/.amplitude_frozen/dods) readdods .amplitude

T (1 Jan 1981) (31 Dec 2010) RANGE

1.0 flaggt mul

/name /phase def

classifyby

T (Jan)

/seasonStart parameter

(-) append (Mar) /seasonEnd parameter append

seasonalAverage [T]average

Daily Streamfunction

Daily MJO phase & amplitude

Classify

Select season & compute seasonal average

MJO composites of circulation variables



SOURCES .NOAA .NCEP-NCAR .CDAS-1 .DAILY .Intrinsic .PressureLevel

a: (.psi)

/var parameter

interp

:a

T (julian_day) streamgridunitconvert

P (200) VALUES

P removeGRID

T (1 Jan 1981) (31 Dec 2010) RANGE

X 0 360 RANGE

Y -60 60 RANGE

(http://datoteca.ole2.org/SOURCES/.BoM/.MJO/.phase_frozen/dods) readdods .phase

T (1 Jan 1981) (31 Dec 2010) RANGE

(http://datoteca.ole2.org/SOURCES/.BoM/.MJO/.amplitude_frozen/dods) readdods .amplitude

T (1 Jan 1981) (31 Dec 2010) RANGE

1.0 flaggt mul

/name /phase def

classifyby

T (Jan)

/seasonStart parameter

(-) append (Mar) /seasonEnd parameter append

seasonalAverage [T]average

sub

Daily Streamfunction

Daily MJO phase & amplitude

Classify

Select season & compute seasonal average

Subtract long-term mean to produce anomalies





```
a- -a correlationcolorscale
/long_name (Stream function ) def
/units (m2/s) def
X Y fig- colors | thin grey contours black thin solid coasts countries -fig
/antialias true psdef
/plotaxislength 700 psdef
/adif -1.0000000E07 1.0000000E07 plotrange
/phase 1.0 plotvalue
/Y -60 60 plotrange
/XOVY null psdef
/framelabel (MJO phase %d[phase] (%=[seasonStart]-%=[seasonEnd] 1981-2010)) psdef
```

Daily Streamfunction

Daily MJO phase & amplitude

Classify

Select season & compute seasonal average

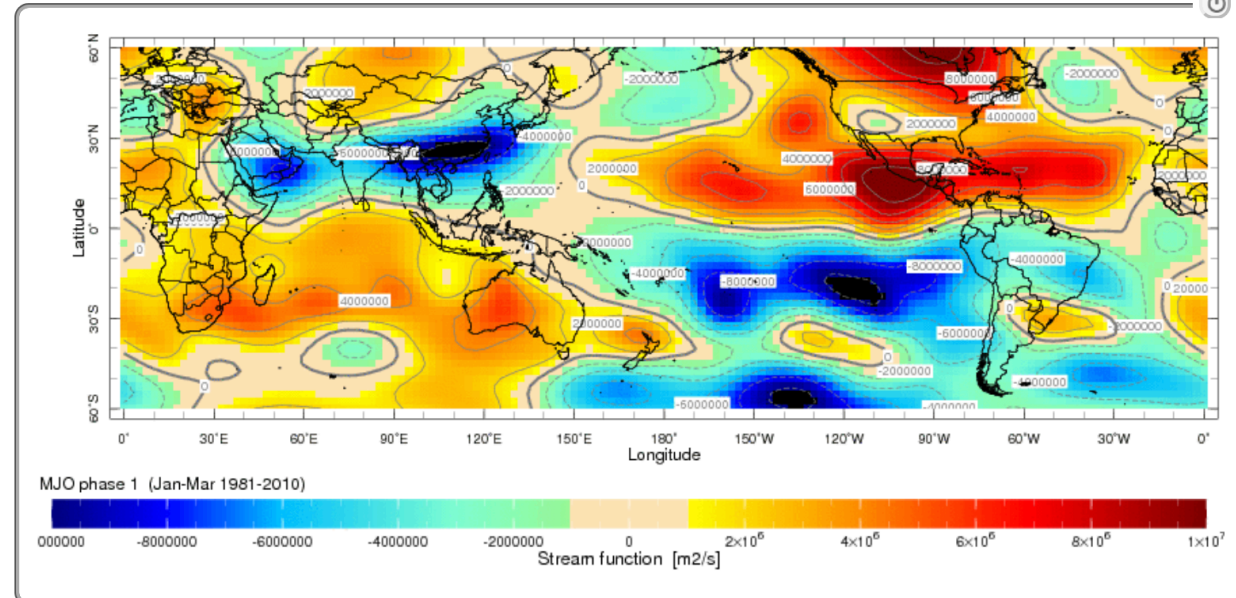
Subtract long-term mean to produce anomalies

Plot

var:

Description Expert Mode Options Instructions

```
SOURCES .NOAA .NCEP-NCAR .CDAS-1 .DAILY .Intrinsic .PressureLevel
a: (.psi)
/var parameter
interp
:a
T (julian_day) streamgridunitconvert
P (200) VALUES
P removeGRID
T (1 Jan 1981) (31 Dec 2010) RANGE
X 0 360 RANGE
Y -60 60 RANGE
(http://datoteca.ole2.org/SOURCES/.BoM/.MJO/.phase_frozen/dods) readdods .phase
T (1 Jan 1981) (31 Dec 2010) RANGE
(http://datoteca.ole2.org/SOURCES/.BoM/.MJO/.amplitude_frozen/dods) readdods .amplitude
T (1 Jan 1981) (31 Dec 2010) RANGE
1.0 flaggt
mul
/name /phase def
classifyby
T (Jan)
/seasonStart parameter
(-) append
(Mar)
/seasonEnd parameter
append
seasonalAverage
[T]average
SOURCES .NOAA .NCEP-NCAR .CDAS-1 .DAILY .Intrinsic .PressureLevel
a: (.psi)
/var parameter
interp
:a
T (julian_day) streamgridunitconvert
P (200) VALUES
P removeGRID
T (1 Jan 1981) (31 Dec 2010) RANGE
X 0 360 RANGE
Y -60 60 RANGE
T (Jan)
/seasonStart parameter
(-) append
(Mar)
/seasonEnd parameter
append
seasonalAverage
[T]average
sub
a- -a correlationcolorscale
/long_name (Stream function) def
/units (m2/s) def
X Y fig- colors |
thin grey contours black thin solid coasts countries -fig
/antialias true psdef
/plotaxislength 700 psdef
/adif -1.000000E07 1.000000E07 plotrange
/phase 1.0 plotvalue
/Y -60 60 plotrange
/XOYV null psdef
```



<https://goo.gl/CBRQjT>



IRI Data Library
NOAA NCEP-NCAR CDAS-1 DAILY Intrinsic PressureLevel

Description Documentation Views Data Selection Data Files Data Tables Expert Mode

SOURCES NOAA NCEP-NCAR CDAS-1 DAILY Intrinsic PressureLevel

NOAA NCEP-NCAR CDAS-1 DAILY Intrinsic PressureLevel

DAILY Intrinsic PressureLevel from NOAA NCEP-NCAR CDAS-1: Climate Data Assimilation System I; NCEP-NCAR Reanalysis Project.

Documents

[outline](#) an outline showing all sub-datasets and variables contained in this dataset

Datasets and Variables

Absolute vorticity	NOAA NCEP-NCAR CDAS-1 DAILY Intrinsic PressureLevel ABSV[X Y I P T]
Geopotential height	NOAA NCEP-NCAR CDAS-1 DAILY Intrinsic PressureLevel phi[X Y I P T]
Stream function	NOAA NCEP-NCAR CDAS-1 DAILY Intrinsic PressureLevel psi[X Y I P T]
Specific humidity	NOAA NCEP-NCAR CDAS-1 DAILY Intrinsic PressureLevel qa[X Y I P T]
Relative divergence	NOAA NCEP-NCAR CDAS-1 DAILY Intrinsic PressureLevel reld[X Y I P T]
Relative vorticity	NOAA NCEP-NCAR CDAS-1 DAILY Intrinsic PressureLevel relv[X Y I P T]
Relative humidity	NOAA NCEP-NCAR CDAS-1 DAILY Intrinsic PressureLevel rhum[X Y I P T]
Temperature	NOAA NCEP-NCAR CDAS-1 DAILY Intrinsic PressureLevel temp[X Y I P T]
zonal wind	NOAA NCEP-NCAR CDAS-1 DAILY Intrinsic PressureLevel u[X Y I P T]
meridional wind	NOAA NCEP-NCAR CDAS-1 DAILY Intrinsic PressureLevel v[X Y I P T]
Velocity potential	NOAA NCEP-NCAR CDAS-1 DAILY Intrinsic PressureLevel vpot[X Y I P T]
Pressure vertical velocity	NOAA NCEP-NCAR CDAS-1 DAILY Intrinsic PressureLevel vvel[X Y I P T]

Independent Variables (Grids)

Pressure	grid: /P (mb) ordered [(1000) (925) (850) (700) (600) (500) (400) (300) (250) (200) (150) (100) (70) (50) (30) (20) (10)] :grid
Pressure	grid: /P0 (mb) ordered [(1000) (925) (850) (700) (600) (500) (400) (300)] :grid
Pressure	grid: /P1 (mb) ordered [(1000) (925) (850) (700) (600) (500) (400) (300) (250) (200) (150) (100)] :grid
Time (time)	grid: /T (days since 1948-01-01 12:00:00) ordered (1 Jan 1948) to (19 Oct 2017) by 1.0 N= 25495 pts :grid
Longitude (longitude)	grid: /X (degree_east) periodic (0) to (2.5W) by 2.5 N= 144 pts :grid
Latitude (latitude)	grid: /Y (degree_north) ordered (90N) to (90S) by 2.5 N= 73 pts :grid

IRI Data Library
NOAA NCEP-NCAR CDAS-1 DAILY Intrinsic PressureLevel

Description Documentation Views Data Selection Data Files Data Tables Expert Mode

NOAA NCEP-NCAR CDAS-1 DAILY Intrinsic PressureLevel[qa temp u vvel ABSV v psi reld vpot phi relv rhum]

SOURCES .NOAA .NCEP-NCAR .CDAS-1 .DAILY .Intrinsic .PressureLevel

OK reset

Share

Contact Us



var .psi
seasonEnd Mar
seasonStart Jan

Description
Expert Mode
Options
Instructions

```

SOURCES .NOAA .NCEP-NCAR .CDAS-1 .DAILY .Intrinsic .PressureLevel
a: (.psi)
/var parameter
interp
:a
T (julian_day) streamgridunitconvert
P (200) VALUES
P removeGRID
T (1 Jan 1981) (31 Dec 2010) RANGE
X 0 360 RANGE
Y -60 60 RANGE
(http://datoteca.ole2.org/SOURCES/.BoM/.MJO/.phase_frozen/dods) readdods .phase
T (1 Jan 1981) (31 Dec 2010) RANGE
(http://datoteca.ole2.org/SOURCES/.BoM/.MJO/.amplitude_frozen/dods) readdods .amplitude
T (1 Jan 1981) (31 Dec 2010) RANGE
1.0 flaggt
mul
/name /phase def
classifyby
T (Jan)
/seasonStart parameter
(-) append
(Mar)
/seasonEnd parameter
append
seasonalAverage
[T]average
SOURCES .NOAA .NCEP-NCAR .CDAS-1 .DAILY .Intrinsic .PressureLevel
a: (.psi)
/var parameter
interp
:a
T (julian_day) streamgridunitconvert
P (200) VALUES
P removeGRID
T (1 Jan 1981) (31 Dec 2010) RANGE
X 0 360 RANGE
Y -60 60 RANGE
T (Jan)
/seasonStart parameter
(-) append
(Mar)
/seasonEnd parameter
append
seasonalAverage
[T]average
sub
a- -a correlationcolorscale
/long_name (Stream function ) def
/units (m2/s) def
X Y fig- colors |
thin grey contours black thin solid coasts countries -fig
/antialias true psdef
/plotaxislength 700 psdef
/adif -1.0000000E07 1.0000000E07 plotrange
/phase 1.0 plotvalue
/Y -60 60 plotrange
/XOVY null psdef
                    
```

MJO phase 1 (Jan-Mar 1981-2010)

Stream function [m²/s]

MJO composites: lead times (rainfall)



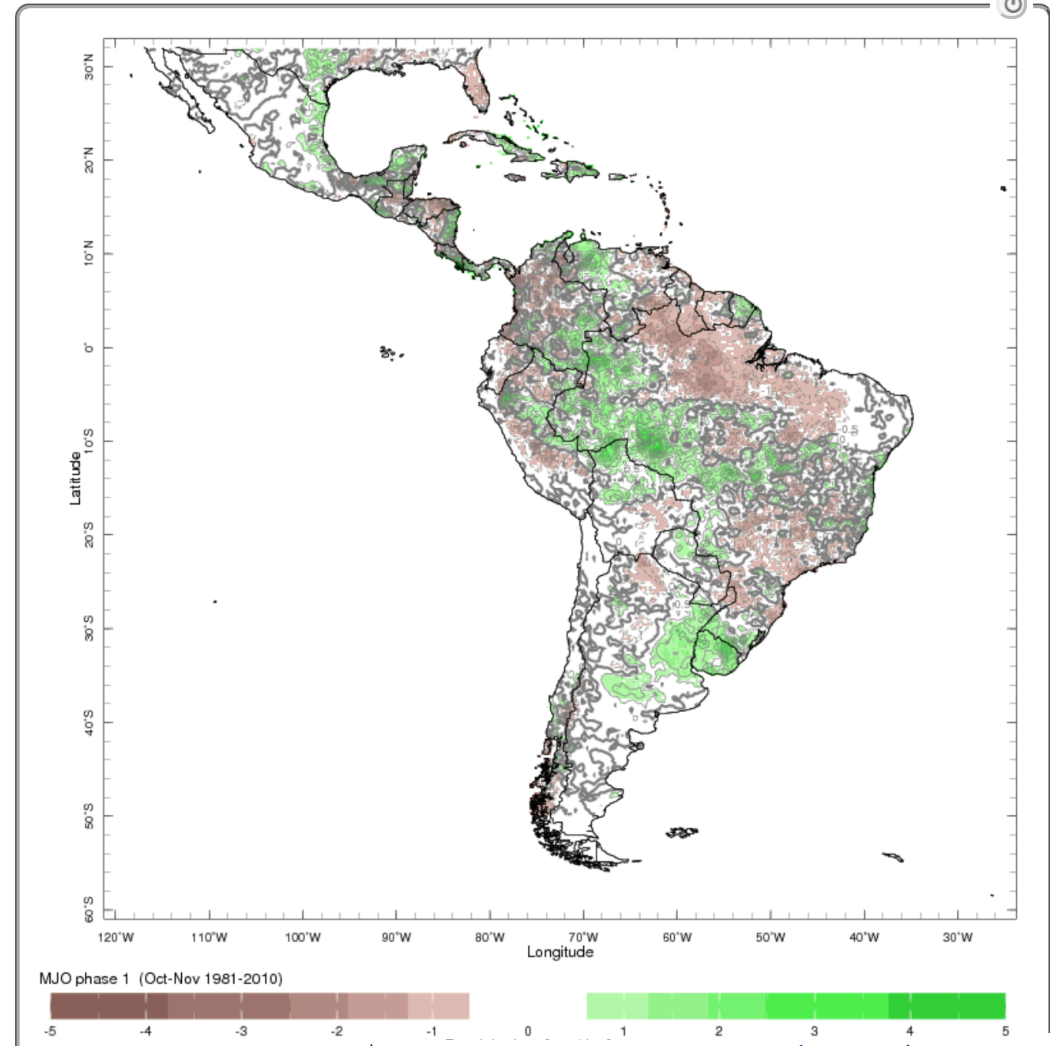
IRI Data Library seasonEnd seasonStart lead var Language

Description Expert Mode Options Instructions

```

SOURCES UCSB.CHIRPS.v2p0.daily.global.0p25
a: (.prcp)
/var parameter
interp
:a
T (1 Jan 1981) (31 Dec 2010) RANGE
X -120 -25 RANGE
Y -60 32 RANGE
(http://datoteca.ole2.org/SOURCES/BoM/.MJO/.phase_frozen/dods) readdods .phase
T (1 Jan 1981) (31 Dec 2010) RANGE
T -10
/lead parameter
shiftGRID
(http://datoteca.ole2.org/SOURCES/BoM/.MJO/.amplitude_frozen/dods) readdods .amplitude
T (1 Jan 1981) (31 Dec 2010) RANGE
T -10
/lead parameter
shiftGRID
1.0 flaggt
mul
/name /phase def
classifyby
T (Jan)
/seasonStart parameter
(-) append
(Mar)
/seasonEnd parameter
append
seasonalAverage
[T]average
SOURCES UCSB.CHIRPS.v2p0.daily.global.0p25
a: (.prcp)
/var parameter
interp
:a
T (1 Jan 1981) (31 Dec 2010) RANGE
X -120 -25 RANGE
Y -60 32 RANGE
T (Jan)
/seasonStart parameter
(-) append
(Mar)
/seasonEnd parameter
append
seasonalAverage
[T]average
sub
a- -a prcpansscale
/long_name (Precipitation) def
/units (mm/day) def
X Y fig- colors |
thin grey contours black thin solid coasts countries -fig
/antialias true psdef
/plotaxislength 700 psdef
/adif -5.0 5.0 plotrange
/phase 1.0 plotvalue
/Y -60 32 plotrange
MJOv2m11 psdef
    
```

<https://goo.gl/3LtBLN>



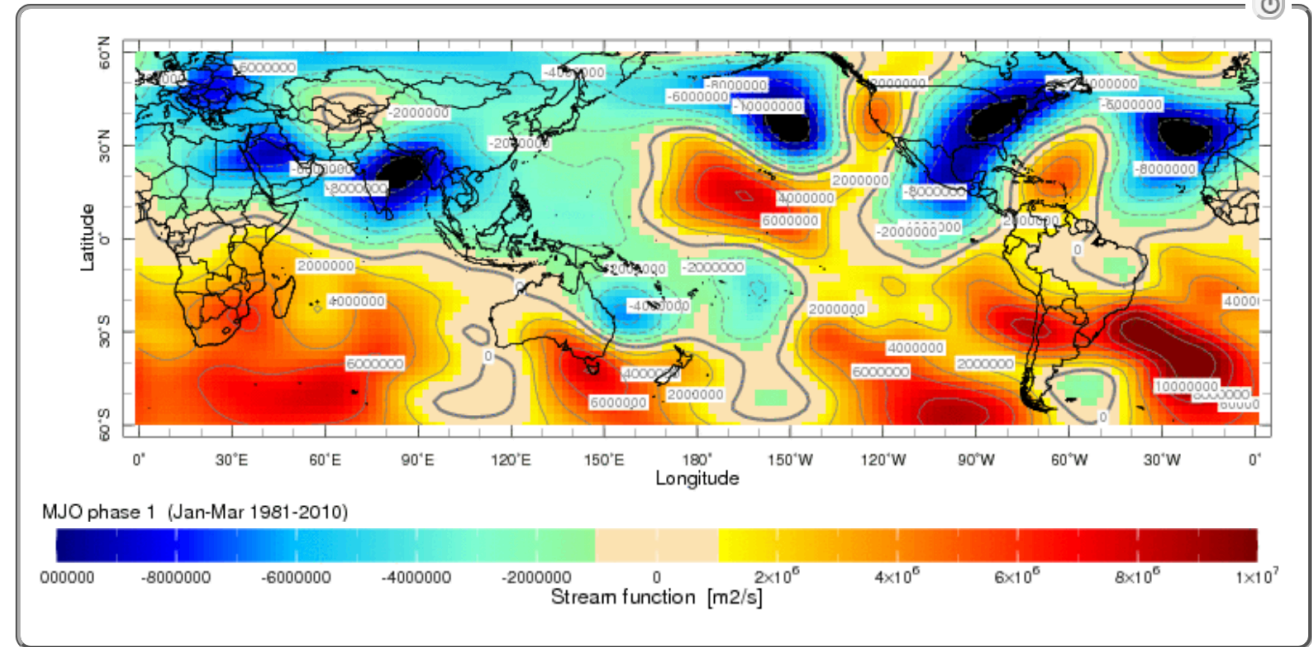
MJO composites: lead times (stream function)



var: .psi | lead: -10 | seasonEnd: Mar | seasonStart: Jan

Description | Expert Mode | Options | Instructions

```
SOURCES .NOAA .NCEP-NCAR .CDAS-1 .DAILY .Intrinsic .PressureLevel
a: (.psi)
/var parameter
interp
:a
T (julian_day) streamgridunitconvert
P (200) VALUES
P removeGRID
T (1 Jan 1981) (31 Dec 2010) RANGE
X 0 360 RANGE
Y -60 60 RANGE
(http://datoteca.ole2.org/SOURCES/.BoM/.MJO/.phase_frozen/dods) readdods .phase
T (1 Jan 1981) (31 Dec 2010) RANGE
T -10
/lead parameter ←
shiftGRID
(http://datoteca.ole2.org/SOURCES/.BoM/.MJO/.amplitude_frozen/dods) readdods .amplitude
T (1 Jan 1981) (31 Dec 2010) RANGE
T -10
/lead parameter ←
shiftGRID
1.0 flaggt
mul
/name /phase def
classifyby
T (Jan)
/seasonStart parameter
(-) append
(Mar)
/seasonEnd parameter
append
seasonalAverage
[T]average
SOURCES .NOAA .NCEP-NCAR .CDAS-1 .DAILY .Intrinsic .PressureLevel
a: (.psi)
/var parameter
interp
:a
T (julian_day) streamgridunitconvert
P (200) VALUES
P removeGRID
T (1 Jan 1981) (31 Dec 2010) RANGE
X 0 360 RANGE
Y -60 60 RANGE
T (Jan)
/seasonStart parameter
(-) append
(Mar)
/seasonEnd parameter
append
seasonalAverage
[T]average
sub
a- -a correlationcolorscale
```



<https://goo.gl/AE8bmc>



var
.tp
seasonEnd
Apr
seasonStart
Mar

Description
Expert Mode
Options
Instructions

```

expert
SOURCES .ECMWF .S2S .NCEP .reforecast .perturbed .sfc_precip
a: (.tp)
  /var parameter
  interp
  :a
X 300 360 RANGE
Y 30 90 RANGE
S (0000 1 Jan 2008) (0000 31 Dec 2010) RANGE
L1 (0) (7) VALUES
[L1]differences
L1 removeGRID
c:
  /name /water_density def
  998 (kg/m3) :c
  div
  /mm unitconvert
  S /T renameGRID
[M]average
SOURCES .ECMWF .S2S .NCEP .reforecast .RMMS .ensemble_mean .phase
S (0000 1 Jan 2008) (0000 31 Dec 2010) RANGE
L (7) VALUE
L removeGRID
S /T renameGRID
SOURCES .ECMWF .S2S .NCEP .reforecast .RMMS .ensemble_mean .amplitude
S (0000 1 Jan 2008) (0000 31 Dec 2010) RANGE
L (7) VALUE
L removeGRID
S /T renameGRID
1. flaggt
mul
/name /phase def
[T]REORDER
CopyStream classifyby
T (Jan)
/seasonStart parameter
(-) append
(Mar)
/seasonEnd parameter
append
seasonalAverage
[T]average
SOURCES .ECMWF .S2S .NCEP .reforecast .perturbed .sfc_precip
a: (.tp)
  /var parameter
  interp
  :a
X 300 360 RANGE
Y 30 90 RANGE
S (0000 1 Jan 2008) (0000 31 Dec 2010) RANGE
L1 (0) (7) VALUES
[L1]differences
L1 removeGRID
c:
  /name /water_density def
  998 (kg/m3) :c
  div
  /mm unitconvert
                    
```

MJO phase 1 (Mar-Apr 1981-2010)

Precipitation [mm/day]

<https://goo.gl/JYSTbB>



Some IRIDL examples

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International Research Institute for Climate and Society (IRI). Columbia University
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Many thanks to Andy W. Robertson, Mike Bell, Jing Yuan, Rémi Cousin



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