Why is the BSISO important?

The dominant mode of variability in the Asian summer monsoon.

It influences on the *summer monsoon onsets, active/break phases of the monsoon and interacts with a wide range of atmospheric circulation and associated weather*.

It is also a *possible source of seasonal climate predictability for precipitation* (Wang et al. 2009a; Lee et al. 2010) and *extratropical atmospheric circulation* (Ding and Wang 2005; Lee et al. 2011; Wang et al. 2012).

The wet and dry spells of the BSISO strongly influence *extreme hydro-meteorological events, major driving forces of natural disasters, and thus the socio-economic activities* in the World’s most populous monsoon region (Lau and Waliser 2005).

*From Lee et al. (2013)*
Enhancing the practical usefulness of APCC’s BSISO information

(July 24, 2018)

Hae-Jeong Kim* and Yoo-Rim Jung
APEC Climate Center
Better forecast? *practical use*

- **Seasonal Forecast**
- **BSISO Forecast**
- **Climate Monitoring**
- **CLK**
- **Data Service**
- **CLIPs**

**Icons:**
- Reliable forecast
- Reasonable interpretation
- Recognition of the value
- Actionable information
Better forecast? *practical use*

What is the actionable information for?

A lot of *flooding* is caused by heavy rain, tropical storm and monsoonal rain, which are *considerably associated with the BSISO activity.*
Better forecast? *practical use*

What is the actionable information for?

When do the floods start?

May to Oct. matches with the period when BSISO is dominant.
Better forecast? *practical use*

Under operational perspective

#1. BSISO impact on heavy rainfall occurrence

#2. Guideline for the practical use and interpretation of BSISO forecast information

: Focused on the *flood prone areas with large rivers over Southeast Asia*
Better forecast? **practical use**

**Procedure**

‘15 ‘16
Better forecast? *practical use*

**Relationship analysis** *(Composite analysis: BSISO-Heavy rainfall probability)*

*Extremely wet event*

AMP ≥ 1

AMP < 1

**Phase 1**

**Phase 2**

**Phase 7**

**Phase 8**

*Days with daily precipitation exceeding 90th percentile*

---

**Probability of heavy rainfall occurrence at a given BSISO phases & amplitude**

\[
\text{Probability} = \frac{\text{number of days [BSISO1}_{\text{AMP}} \geq 1, \text{ BSISO1 phase1, daily PRCP > 90th percentile]} \times 100}{\text{number of days [BSISO1}_{\text{AMP}} \geq 1, \text{ BSISO1 phase1]}}
\]

Lee et al. (2017). Subseasonal prediction of extreme precipitation over Asia: Boreal summer intraseasonal oscillation perspective, J. Climate, 30(8), DOI: 10.1175/JCLI-D-16-0206.1
Better forecast? *practical use*

**Relationship analysis** (Composite analysis: BSISO-Heavy rainfall probability)

**Probability of extreme rainfall occurrence based on BSISO phases**

- [e.g. MAY, BSISO1>=1.0]
- [e.g. JUL, BSISO2>=1.0]
Better forecast? *practical use*

**Procedure**

‘15 ‘16

- Selecting target area
- Relationship Analysis
- Mechanism Analysis
- Producing Forecast
- Case study evaluation
- Forecast skill assessment

**Guideline**
Better forecast? *practical use*

Selecting target area

#R1. Developing countries in the APEC region
#R2. Predictable region from the view of meteorologist

Reliability categorization of precipitation forecasts

The skill over Southeast Asia is useful. It is consistent among the events and seasons.

Better forecast? *practical use*

**Selecting target area**

#R3. Flood prone areas with large rivers from the view of hydrologist

http://floodobservatory.colorado.edu
Better forecast? *practical use*

Relationship analysis  *(Composite analysis: BSISO-Heavy rainfall probability)*
Better forecast? practical use

Relationship analysis (Composite analysis: BSISO-Heavy rainfall probability)

BSISO2 (10, 90%, over 1.0)
Better forecast? *practical use*

Relationship analysis (Composite analysis: BSISO-Heavy rainfall probability)

**Probability of Heavy Rainfall occurrence [Mekong River]**
Better forecast? *practical use*

**Strategy**

‘15 ‘16

- Selecting target area
- Relationship Analysis
- Mechanism Analysis
- Producing Forecast
- Case study evaluation
- Forecast skill assessment

Guideline
Better forecast? **practical use**

Mechanism Analysis  ( *BSISO-Extreme rainfall probability*)

Because the precipitation in Thailand is *influenced by local monsoon winds* rather than Indian monsoon or WNP monsoon, a new set of indices incorporating these winds was explored and these four indices are named the *Indo-China Monsoon Indices (ICMIs)*. These ICMIs **better explain the rainfall** over Thailand monsoon domain.


Figure 8 | Domain of ICMIs. The boxes represent the domains of ICMIs and the numbers represent the type of ICMIs.
Better forecast? *practical use*

**Mechanism Analysis  (BSISO-Extreme rainfall probability)**

[MAM] TMD are influenced by the developing phase of the Southeastern Asian Summer Monsoon. This monsoon early signal can be detected *from the changing zonal wind east of Sri Lanka*.

[JJA] The strengthening of *the easterlies east of Hainan Island* brings extra precipitation to TMD.

[SON] Normal/slow decaying Southeastern Asian Summer Monsoon and *southerlies in south of Vietnam* are necessary to bring extra precipitation to TMD.

---


*Figure 8 | Domain of ICMIs. The boxes represent the domains of ICMIs and the numbers represent the type of ICMIs.*
BSISO can contribute to the favorable condition in making strong Indo-China monsoon and bringing extra precipitation to TMD.
Mechanism Analysis (BSISO-Extreme rainfall probability)
Mechanism Analysis (BSISO-Extreme rainfall probability)
Better forecast? *practical use*

Mechanism Analysis  *(BSISO-Extreme rainfall probability)*

Probability table marked with favorable wind condition which can contribute strong Indo-China monsoon and bring heavy rainfall.
Better forecast? practical use

Strategy

'15 '16

- Selecting target area
- Relationship Analysis
- Mechanism Analysis
- Producing Forecast
- Case study evaluation
- Forecast skill assessment

Guideline
### Better forecast? *practical use*

Producing Forecasts estimated by BSISO indices

#### BSISO real-time forecast

<table>
<thead>
<tr>
<th>YEAR</th>
<th>DAY</th>
<th>BSISO1</th>
<th>BSISO2</th>
<th>B1phs</th>
<th>B2phs</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>262</td>
<td>0.395</td>
<td>0.734</td>
<td>P3</td>
<td>P6</td>
</tr>
<tr>
<td>2015</td>
<td>263</td>
<td>0.154</td>
<td>0.753</td>
<td>P3</td>
<td>P6</td>
</tr>
<tr>
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<td>0.190</td>
<td>0.223</td>
<td>P3</td>
<td>P6</td>
</tr>
<tr>
<td>2015</td>
<td>265</td>
<td>0.600</td>
<td>0.833</td>
<td>P3</td>
<td>P6</td>
</tr>
</tbody>
</table>

**BSISO forecast index**

\[ f (Amplitude, Phase) \]
Better forecast? *practical use*

**Producing Forecasts estimated by BSISO indices**

**BSISO real-time forecast**

**Composite Anomalies associated with the BSISO**

<table>
<thead>
<tr>
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<th>BSISO2</th>
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</table>

**BSISO forecast index**

\[ f(\text{Amplitude, Phase}) \]
Better forecast? *practical use*

Producing Forecasts estimated by BSISO indices

**BSISO real-time forecast**

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<td>0.600</td>
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<td>P3</td>
<td>P6</td>
</tr>
</tbody>
</table>

**BSISO forecast index** = \( f (\text{Amplitude, Phase}) \)

**Observational relationship**

**Composite Anomalies associated with the BSISO**

\[ [\text{Mon, BSISO > 1.0} \]

**Prediction of anomalies associated with the BSISO**

\[ \text{B1P3} \times \text{Amp}_{\text{BSISO1}} + \text{B2P6} \times \text{Amp}_{\text{BSISO2}} \]

\[ \times 0.395 + \times 0.734 \]

\[ \]
Better forecast? *practical use*

**Strategy**

'15 '16

- Selecting target area
- Relationship Analysis
- Mechanism Analysis
- Producing Forecast
- Forecast skill assessment
- Case study evaluation

Guideline
Better forecast? *practical use*

**Forecast skill assessment**: *Data and Verification metrics*

<table>
<thead>
<tr>
<th>Period</th>
<th>2013 ~ 2015</th>
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<tbody>
<tr>
<td>Season</td>
<td>MJJASO</td>
</tr>
<tr>
<td>Lead</td>
<td>WEEK1, WEEK2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>ECM</th>
<th>BOM</th>
<th>CFS</th>
<th>GFS</th>
<th>CWB</th>
</tr>
</thead>
<tbody>
<tr>
<td># of sample</td>
<td>104</td>
<td>80</td>
<td>285</td>
<td>300</td>
<td>29</td>
</tr>
</tbody>
</table>

**Multi-category forecasts**: *Brier Skill Score*

<table>
<thead>
<tr>
<th></th>
<th>Observed</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PoHR &lt;= 0.3 mm</td>
</tr>
<tr>
<td>Forecast</td>
<td>n(F1,O1)</td>
</tr>
<tr>
<td>1</td>
<td>n(F2,O1)</td>
</tr>
<tr>
<td>2</td>
<td>n(F3,O1)</td>
</tr>
<tr>
<td>Total</td>
<td>N(O1)</td>
</tr>
</tbody>
</table>

From the Finnish Meteorological Institute (FMI)
Better forecast? **practical use**

**Forecast skill assessment**

Probability forecasts of heavy rainfall in Mekong river basin show *improvements over 30-50%* relative to climatological forecast at the lead time of WEEK2.
Better forecast? *practical use*

Delivery of user friendly forecast information

*On the APCC webpage*
*For upcoming week1 and week2*
*Everyday updated*

BSISO phase diagram may be difficult information for ordinary people.

So it is meaningful that simple index can be transformed into *user friendly information* such as rainfall.
1. Confirm the forecast of BSISO phase and amplitude for next two weeks

→ 15-20 Sep 2013

B1P7-8, B2P1-2
1. Confirm the forecast of BSISO phase and amplitude for next two weeks

→ 15-20 Sep 2013

B1P8-7, B2P1-2

2. Find the relationship btw BSISO phase and heavy rainfall probability in the user guide.

→ B1P8-7 (Sep) W ~20%

B2P1-2 (Sep) E, W ~25%
3. For easier viewing, you can go to heavy rainfall probability forecast map in the APCC website.
4. If you want to know the cause of easterlies and circulation pattern, look it up in the mechanism chapter or Appendix.

→ Indo-China peninsular has favorable conditions for having easterly (westerly) wind due to a strong convective cell (anticyclonic cir.) located on the Philippine sea and the northwest Pacific (the Indian Ocean).
5. There are some points to be duly considered. ➔ Probability forecasts of heavy rainfall at 1-week and 2-week lead show improvements of 30% - 50% relative to climatological forecasts over the Mekong river.
Better forecast from better recognition of the value

Development of a guideline to increase practical use of BSISO forecast

Heavy rainfall forecast based on BSISO index forecast [ECMWF]

- Ex> Japan flood, 398mm/4hr, July 6, 2017
Better forecast by actionable information

Heavy rainfall forecast based on BSISO index forecast [ECMWF]

- Ex> Japan flood, 398mm/4hr, July 6, 2017

BSISO forecasts

Flood Inundation Mapping

Probability of heavy rainfall determined by predicted BSISO

© APEC Climate Center
**Application Possibility: Typhoon**

**BSISO activity in 2015**

**BOM**

BSISO Forecast for 28June2015-17July2015

**ECMWF**

BSISO Forecast for 29June2015-18July2015

<table>
<thead>
<tr>
<th>BSISO1, 2에 대한 Phase 변화</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BOM 날짜</strong></td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>3</td>
</tr>
<tr>
<td>4</td>
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<td>5</td>
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<tr>
<td>18</td>
</tr>
<tr>
<td>19</td>
</tr>
<tr>
<td>20</td>
</tr>
</tbody>
</table>

| ECM 날짜 | BSISO1 | BSISO2 |
|----------------|
| 1 | 6/29 | 5 | 7 |
| 2 | 6/30 | 6 | 7 |
| 3 | 7/1 | 6 | 7 |
| 4 | 7/2 | 6 | 7 |
| 5 | 7/3 | 6 | 8 |
| 6 | 7/4 | 6 | 8 |
| 7 | 7/5 | 6 | 8 |
| 8 | 7/6 | 6 | 1 |
| 9 | 7/7 | 7 | 1 |
| 10 | 7/8 | 7 | 2 |
| 11 | 7/9 | 6 | 2 |
| 12 | 7/10 | 6 | 3 |
| 13 | 7/11 | 6 | 3 |
| 14 | 7/12 | 7 | 3 |
| 15 | 7/13 | 7 | 4 |
| 16 | 7/14 | 8 | 4 |
| 17 | 7/15 | 1 | 4 |
| 18 | 7/16 | 1 | 4 |
| 19 | 7/17 | 1 | 4 |
| 20 | 7/18 | 1 | 4 |

*normalized amplitude가 1이상 인 경우*
Application Possibility: Typhoon

BSISO activity in 2015

BSISO1+BSISO2 C

BSISO1+BSISO2 OLR&850hPa Wind anomaly (BOM)
Application Possibility: Typhoon

TC activity in 2015
Application Possibility: Typhoon

TC activity in 2015

Number of strong BSISO day (BSISO 1)

May

Jun

Jul

Aug
Application Possibility : Typhoon

TC activity in 2015

Number of strong BSISO day (BSISO 2)

May

Jun

Jul

Aug
Application Possibility: Typhoon

TC activity in 2015

Averaged BSISO amplitude

BSISO1

BSISO1 (>1.0)

BSISO2

BSISO2 (>1.0)
Application Possibility: Typhoon

TC activity in 2015

North Pacific (NW Pacific + NE Pacific) ACE Through July 17

North Pacific ACE is 30% higher for this time of year than at any other time since 1971!

Source: Philip J. Klotzbach, Colorado State University
Application Possibility: Typhoon

TC activity in 2015

TC development in conjunction with El Nino/MJO

EL NINO MEETS MJO
When atmospheric and oceanic oscillations combine

By Chris Borg

The words "El Nino" have made their way back into the news over the last few months by slowly, but surely, warming up waters of the tropical Pacific.

Now that El Nino has strengthened and is on the verge of breaking some temperature records in the central tropics, the world’s best known atmospheric/oceanic event is being credited with causing nearly every weather anomaly anywhere in the Pacific. Of course not all of those claims are valid. While El Nino is definitely the star of the show, there are other players involved too. Like the MJO, for instance.

Handhu Fahl: Male Atolls

Source: Chris Borg, Surfline

The West Pacific tropics are going looney right now thanks primarily to the active phase of the MJO, but also to strengthening El Nino conditions. Image courtesy of NOAA.
Application Possibility: Typhoon

BSISO-TC activity relationship

OLR & 850hPa wind composite anomaly

a) BSISO1 AUG

b) BSISO2 AUG

BSISO-TC relationship
Application Possibility: Typhoon

BSISO-TC activity relationship

BSISO1+BSISO2 OLR&850hPa Wind anomaly (ECM)  Forecast

9: Chanhom
10: Linfa
11: Nangka
Application Possibility: Typhoon

BSISO1+BSISO2 OLR&850hPa Wind anomaly (BOM) 2016 2 AUG.~21 AUG.
Application Possibility: Typhoon

BSISO1+BSISO2 OLR&850hPa Wind anomaly (BOM)

2016

2 AUG.~21 AUG.
Application Possibility: Typhoon

BSISO-TC activity relationship

Is there any relationship between strong BSISO activity and TC activity in 2015?

Can BSISO forecast give some information on early detection for typhoon formation?

BSISO-WP TC relationship

- Focused on the \textit{TC related variables} (e.g. Nolan et al., 2007; Camargo et al., 2000)
  - Absolute vorticity at 850 hPa, relative humidity at 700 hPa, maximum potent intensity,
  - vertical shear between 850 and 200 hPa, Genesis Potential Index
Here is an interesting cyclonic formation in the Indian Ocean (see the attached image). One each in the Arabian Sea and Bay of Bengal and two more just south of the equator. Are they all interconnected? Any comments on this particular formation? I see that there are some studies on cross-equatorial twin cyclones, where each cyclone impact the growth and track of the other cyclone.

Here is one study:  http://onlinelibrary.wiley.com/doi/10.1029/2000JD000066/full

Regards, Roxy
Application Possibility: Typhoon

BSISO-TC activity relationship

(RM1, RM2) phase space for 15-Apr-2017 to 24-May-2017

MJO Index Forecast for 18May2017-29Jun2017

Labelled dots for each day.
Blue line is for May, green line is for Apr, red line is for Mar.
Application Possibility: Typhoon

BSISO-TC activity relationship

BSISO Monitoring for 16Apr2017~25May2017

BSISO 1
Bay of Bengal & South China Sea

BSISO 2
N. East Asia & S. East Asia

© APEC Climate Center
Application Possibility: Typhoon

BSISO-TC activity relationship

BOM fields estimated by BSISO index: 20170521(+4day)

(a) OLR & 850hPa Wind

(b) PRCP

(c) SLP & Moist. Flux & Moist. Conv.

(d) T2M
Application Possibility : Typhoon

BSISO-TC activity relationship

ECM fields estimated by BSISO index: 20170522(+3day)
Application Possibility: Typhoon

BSISO-TC activity relationship

ECM fields estimated by BSISO index: 20170525(+1day)

- **B1:** 4
- **B2:** 3

(a) OLR & 850hPa Wind
(b) PRCP
(c) SLP & Moist. Flux & Moist. Conv.
(d) T2M
Roxy
I am jumping in to discussion rather late. What you have shown is cyclonic circulations and not the cyclonic formation. These do not have vertical continuity in the vorticity field. These are not seen on the next days chart also. Such cyclonic circulations are seen to present every day on the Indian land area at lower and middle troposphere. These are formed by conversion of shear vorticity into curvature vorticity and from energetic's point of view $K_z$ to $K_e$ conversion. Sometimes these are formed due to meeting of winds from two directions which produces convergence and voricity. These do not have vertical structure like lows, depressions. Their lifetime is also small (one day). They do not travel much.

jrk

Hi All,
Please see below the CFAN forecast for eminent TC approaching Bangladesh. Surprisingly, no warnings from IMD, BMD, Bangladesh FFWC or RIMES. This is alarming (and disappointing) given that the CFAN EC-based forecast suggests a severe TC landfalling within 3 days!. I will keep you posted. PW
Dear All,

Related to this I would like to bring to your notice that IMD/Regional Specialized Met Center New Delhi had indicated in their morning Bulletin of 26th May with 51% to 75% probability of cyclogenesis in next 48 to 72 hrs. Thereafter regular bulletins are being issued with raising probability to 76% to 100% on 27th morning. Latest Bulletin is copied below. You may refer website www.rsmcnewdelhi.imd.gov.in for updates.

Sharing forecasts/warnings are most welcome. Let us all work towards safer world by providing timely warnings.

Wth best wishes, Ajit Tyagi
Hi,
The 850hPa wind jet in the equatorial Indian Ocean:
This low level wind jet in the Indian Ocean has been there, almost stationary, for two weeks now.
To illustrate I have attached three 850hPa analyses from 12UTC on 14 May, 24 May and 29 May.
This jet was the main synoptic feature associated with the very heavy rainfall on the South and Southwest coasts of Sri Lanka around 24-25 May, which led to the devastating flooding and loss of life.
In addition, it was the central westerly as part of the structure of the twin cyclones, one of which became tropical storm Mora.
The twin cyclones have been discussed a bit already, and as pointed out they have the dynamical structure of an n=1 Rossby Wave. Still, to me its mysterious. What has maintained this feature for so long? Why stationary? (Rossby wave embedded in a background westerly flow?).
What effect has such a sustained wind had on the underlying ocean?
Any dynamical insights out there?
I’ll get out of your way
John McB
Peter

Thanks for sharing CFAN forecasting - it is rather surprising why there is no forecast from the regional met services. Any ideas of recent floods in Sri Lanka - every monsoon is so different and intriguing...and keeps us busy


-Anna
BSISO condition for 14May ~ 25May

B1 is active in Phase 8
B2 is active in Phase 4-3-2

BSISO Monitoring for 21Apr2017~30May2017

BSISO 1
Bay of Bengal & South China Sea

BSISO 2
N. East Asia
S.East Asia

© APEC Climate Center
Application Possibility: Typhoon

BSISO-TC activity relationship

Thought that BSISO2 might contribute to stationary westerlies over the equatorial Indian Ocean.
Application Possibility: Typhoon

BSISO-TC activity relationship

WNP TC

Deterministic forecast (ISGPI)

Probability forecast of TC Occurrence

BSISO modulation of tropical cyclone genesis and sub-seasonal prediction - A new intraseasonal GPI for Northern Hemisphere (NH) summer (May-Oct)

[Moon et al., 2017, submitted to J. Climate]
Application Possibility: Typhoon

BSISO-TC activity relationship

ISGPI estimated by BSISO indices

- 5/23
- 5/24
- 5/25
- 5/26
- 5/27
- 5/28
Application Possibility: Typhoon

BSISO-TC activity relationship
Application Possibility: Typhoon

BSISO-TC activity relationship

2017 TC #7 ROKE
2017 TC #8 SONCA
Application Possibility: Typhoon

BSISO-TC activity relationship
What APCC do?

- BSISO application
- ISGPI forecast using BSISO forecast for TC Khanun (20)
- Model: ECMWF

ECM fields estimated by BSISO index: 20171005(+0day)

(a) OLR & 850hPa Wind

(b) PRCP

(c) SLP & Moist. Flux & Moist. Conv.

(d) T2M

B1: 1
B2: 1
Application Possibility: Typhoon

BSISO-TC activity relationship

ISGPI forecast using BSISO forecast for TC Khanun (20)

Model: ECMWF

[Map images showing forecast data for different times and locations]

- L2: 1007
- L4: 1009
- L6: 1011
- L7: 1012
- L8: 1013

3PM 11th Oct. TD
12AM 12th Oct TC [123.6E, 18N]
Application Possibility: Typhoon

BSISO-TC activity relationship

TC Khanun (20)
Application Possibility : Typhoon

BSISO-TC activity relationship

ISGPI forecast using BSISO forecast for TC Lan (21)

Model : ECMWF

15th Oct
TD

16th Oct
TC

L10 : 1012
L11 : 1013
L12 : 1014
L13 : 1015
L14 : 1016
L15 : 1017
Application Possibility : Typhoon

BSISO-TC activity relationship

TC Lan (21)
Better forecast from better recognition of the value

Development of a guideline to increase practical use of BSISO forecast

**Heavy rainfall forecast based on BSISO index forecast [ECMWF]**

- **Ex> Japan flood, 398mm/4hr, July 6, 2017**

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<th>GFS</th>
<th>UKM</th>
<th>ECM</th>
<th>CWB</th>
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<tbody>
<tr>
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<td></td>
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Probability of heavy rainfall determined by predicted BSISO

- Probability of occurrence for heavy rainfall event as defined by daily rainfall exceeding the 90th percentiles value (21.4 mm/day) for Oct. during 1981-2010.

**ISGPI forecast estimated by BSISO index forecast [ECMWF]**

- **Ex> Tropical Cyclone Mora-17, May 28, 2017**

L10 5/28
L09 5/27
L07 5/25
L05 5/23
L03 5/21
I.C. 5/18

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Application Possibility

BSISO-extreme events relationship

‘16

‘17’18

‘17’18
Application Possibility: S. Korea heatwave

BSISO-heatwave relationship

폭염인 지점수가 30개 이상일 때 BSISO phase 에 따른 폭염일수
(한반도의 상당한 지역이 폭염으로 고생할 때 BSISO 와의 관련성)

(* 폭염지수 from 이우섭 박사 (1981-2014)*)
Application Possibility: S. Korea heatwave

BSISO-heatwave relationship

Monitoring (7/12 ~ 8/20)

Bay of Bengal & South China Sea

Indo & Maritime Continental

Normalized BSISO1 - 1

Eq Indian Ocean Western North Pacific

Normalized BSISO1 - 2

Phase 1

Phase 2

Phase 3

Phase 4

Phase 5

Phase 6

Phase 7

Phase 8

MJJASO

Aug
Application Possibility: S. Korea heatwave

Monitoring (7/12 ~ 8/20)

BSISO 1
Bay of Bengal & South China Sea

Forecast

I.C.: 7/25

I.C.: 7/28

I.C.: 8/1
Application Possibility: S.Korea heatwave

BSISO1+BSISO2 Temperature anomaly (MONITORING)

BSISO1+BSISO2 Temperature anomaly (BOM)

BSISO1+BSISO2 Temperature anomaly (ECM)
Thank you