# IMF Bz Team

Neel Savani | (Pete Riley)

- Summary:
  - What we have achieved so far.
- Workshop:
  - What we will focus on this week.
- Moving forward:
  - Strategy of keeping up the momentum

# Summary

## Executive 'Tiger' team

- Small team of active participants from around the world:
  - National forecasters
  - Scientists
  - Other Team Leads

## 'Tiger' / 'S.W.A.T' teams

Special Weapons and Tactics

Space weather and ....

# Summary

## Executive 'Tiger' team

- Small team of active participants from around the world:
  - National forecasters
  - Scientists
  - Other Team Leads

- Slack communication system
  - 16 people
  - 8 Countries
  - 10 Time Zones

slack

## Scientists

| | |
|---|---|
| N. Savani | P. Riley |
| L. Mays | M. Owens |
| Y. Collado Vega | A. Vourlidas |
| S. Patsourakos | C. DeForest |
| A. Rouillard | S. Poedts |
| D. Shiota | E. Henley |
| C. Verbeke | N. Lugaz |
| R. Steenburgh | C. Dekonig |

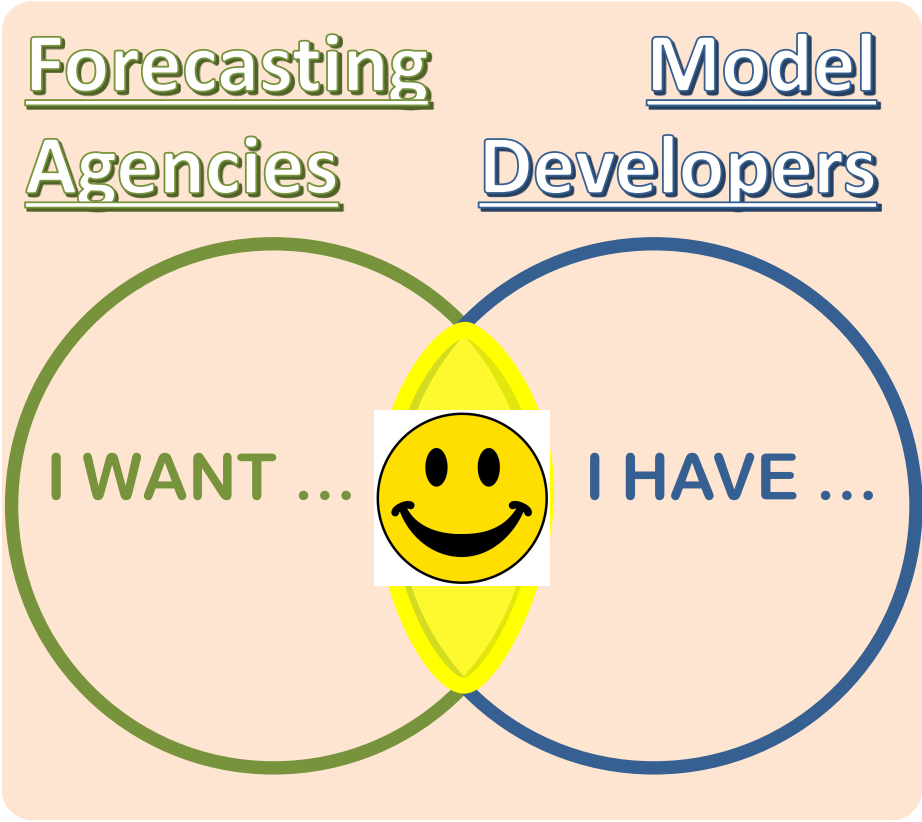
## Forecasting agencies

US NOAA / SWPC
UKMO / MOSWOC
Japan NICT / SWx

# Summary

## Goals of Exec. team

- 'Seed' open questions and themes
- Instigate core themes
  - Find ground between desires <> near-term achievable deliverables




**Data Driven**

Bz4Cast (Savani Swx 2015)

H-CME (Patsourakos A&A 2016)

A. Rouillard (IRAP)

**Numerical MHD**

SUSANOO (Shiota SWx 2016)

EUHFORIA (KU Leuven)

(EEGL) (Jin ApJ 2017)

**Recommendation Algos**

ProjectZed (Riley SWx 2017)

# Summary

## Open Themes

- Draft themes sent to whole Community
  - Feb 2017
  - > 110 participants
  - 6 themes to be discussed this week

## Wednesday session

1. Background Solar Wind
2. Core event selection
3. Magnetic What?
4. B Magnitude threshold
5. Time resolution
6. Validation Metric

Community Coordinated Modeling Center

International Forum for Space Weather Capabilities Assessment

Related Links | Frequently Asked Questions | Community Feedback | Downloads | Sitema

About | Models at CCMC | Request A Run | View Results | Instant Run | Metrics and Validation | Education | R2O Support | Mission Support | Community Support | Tools

Forum Home | Working Teams & Topics | Overall Goals and Deliverables | CCMC-LWS Working Meeting | Contact Us/Sign Up | FAQ

### IMF Bz at L1 Working Team

**Leads:** N. Savani, P. Riley (contact team leads/forum organizers to be added to the team)

**Communications:** ccmc-imf-bz@googlegroups.com (mailing list)
**Participants:** Eric Adamson · Nick Arge · Michael Balikhin* · Francois-Xavier Bocquet · Sean Bruinsma* · Yaireska Collado-Vega* · Pedro Corona-Romero* · Curt de Koning* · Manolis K. Georgoulis* ·

# Summary

1. Background SW Conditions

1. Evaluation at a 1-minute resolution is probably required. Pragmatically, as most inputs into magnetospheric models are at 1min resolution, we expect a validation metric at this level is needed. We also expect most models will perform poorly under this criterion.
2. Datapoint to datapoint (dp2dp) evaluations should be included in a final set of metrics, even though they might be misleading if not properly assessed.
3. Actionable intelligence can be estimated by a forecast that provides accurate |B| and fluctuation intensity, regardless of dp2dp phase. How this is evaluated remains outstanding.
4. "Event-based" metrics should also be performed. Such as for High speed stream. How this is evaluated remains outstanding.

# Summary

## 2. Core event selection

1. As a process of advancing models from research into the operational domain (R2O), the suggestion is to include 3 phases of metric evaluation.
    a. A small core selection of 'ideal case studies'. – ~10 events so that the initial hurdle for future models remains low.
    b. A full collection of realistic events. – ~50 events that include the full range of 'complicated' behaviour observed in the heliosphere
    c. Blind selection. – a final group of events that also covers the full domain of observable CME events. This group of events will remain blind to model developers until their models have passed all previous ARL requirements. Models will be required to test forecasting skill in a virtual real-time environment.
2. The SCOSTEP/ ISEST event list has been identified a useful source of events from which 'textbook' and other 'non-ideal' events may be selected. Final selection of events remains outstanding.
3. Overlapping CME events with iCCMC Arrival Time Topic with be of added benefit to the wider community. Further cross-talk remains active.

# Summary

3. Magnetic What?

1. Cartesian coordinate system (opposed to spherical) of the magnetic vectors has shown significant support from both model developers and end users.
2. Distilling the vector direction into a single skill metric is not a necessary goal for end users (SWPC or UKMO). Best to approach the problem with multiple metrics that can, at a later stage, condensed into a meaningful way by the operators.
3. UKMO would prefer metrics performed in GSE coordinates.
4. RTN system (locally Cartesian) would provide a more universal metric that remains applicable to all future interplanetary endeavours. While this is not ideal from an Earth Space weather, it might be manageable for operators such as UKMO. A louder preference from the wider community between RTN and GSE would assist with the final decision.

## 4. B Magnitude threshold

1. A strong preference has been shown for multiple thresholds. This approach also assists with further activity into ensemble research.
2. A current procedure of action at both SWPC and UKMO is triggered for Bz < -5nT sustained for more than 30min. This provides an initial benchmark of interest.
3. Further intensity thresholds and for what time duration remains outstanding.

## 5. Time resolution

1. Metrics developed at 1 minute resolution is of benefit to a variety of users – e.g. magnetospheric and GIC applications.
2. 1min, 5min, and 1 hour from the OMNIweb data rates are currently considered for further evaluation.
3. Keeping to the OMNI/ COHOweb data standards enables for the widest possible community to participate using standardised data inputs. – Suggestions have been made to avoid getting bogged down into such prolonged scientific discussions of how best to average the data at this early stage.
4. For the sheath region downstream of a CME-driven shock, concerns have been raised that 1 hour resolution would not capture desired variations and 5 minute would include too much. How best to evaluate the sheath remains outstanding.
5. Do we need different resolutions for different applications and end users? If so, which communities and how many are there. This question remains outstanding.

# Summary

## 6. Validation Metric

1. General consensus is that a broader collection of skill metrics are required moving forward. We should aspire to develop metrics that are more comprehensive than the current 'Probability of Detection' used by SWPC.
2. Very strong advocation for reporting confidence (uncertainty) levels. There is strong support on both scientific community and by end users.
3. However, an outstanding issue remains on how to incentivise the scientific community to increase efforts towards more accurate estimates of the confidence levels. I.e. "There's a big difference in usability between a forecast of 'danger' with unknown confidence, a forecast of 'danger with 60% probability'".
4. Traditional weather forecasting has significant experience which should be leveraged wherever possible. "Dysfunctional skills are taught by using simplistic means [e.g. GPRA] to measure value". It remains outstanding on how this community aims to ensure lessons learnt by weather forecasting will be implemented.

# Workshop

## Topic Themes

- Predominately Wednesday
- LIVE MINUTE UPDATES
  - Links on CCMC IMF Bz website
  - Assist those in parallel sessions

## Wednesday session

1. Background Solar Wind
2. Core event selection
3. Magnetic What?
4. B Magnitude threshold
5. Time resolution
6. Validation Metric

**Live workshop updates**

➡ **April 2017 working meeting: team agenda | solar/heliosphere agenda | f**

Following on from the original draft document that went out to the community, we will be discussing each of th
find areas of agreement and complexities to resolves. We test a novel approach to the discussion by attemptir
is open to everyone, and contributions are solicited to the entire community. **Wednesday's** live updates can b
➡ **https://goo.gl/m2kICP**

In addition to the **live updating** of the Wednesday session. The follow up session on Thursday will predomina
**Thursday's** live updates can be found here:
➡ **https://goo.gl/ZatBiR**

If anyone has ideas they wish to convey, please feel free to upload them here, and convey a summary via em
➡ **https://goo.gl/B2AGQO**

# Moving Forward

## Future Strategy

- Set key actions for Model developers
  - E.g. Which Events to prioritise
- Define coordinated goals for the next 12 months.
- Active voice / participation requested from largest possible community

**Thursday session**

1. ARL positioning for Bz actions
2. CCMC Bz Scoreboard
3. Improve interfacing between R2O with O2R
4. Open-Mic Action items

# <NAME SURNAME>

## < #.SubjectTheme(DraftDoc)>

- Blah Blah … □□□
Blah Blah.

- R2O… □□□ R2O.

- O2R … □□□
O2R.

Your IMAGE HERE