

Astronomy Outreach in India

Towards a BRICS Initiative

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BRICS Astronomy Workshop, Sep 2017



- **The POEC of the ASI**
- **Highlights of POEC activities**
- **POEC: roadmap for the future**
- **Astronomy EPO and BRICS**
- **Feedback from BRICS members**
- **Strengths and commonalities**
- **Discussion**

Astronomy Outreach in India

Astronomy EPO in India

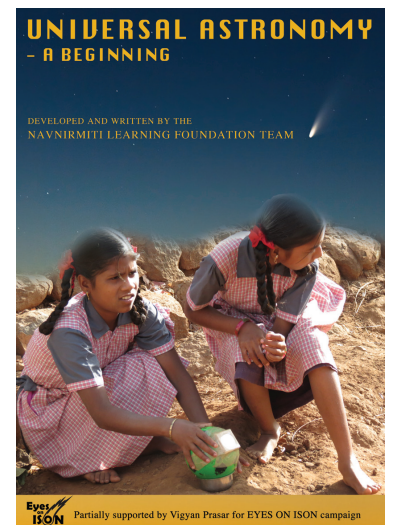
India has a vibrant history of astronomy outreach and education for many decades, carried out by diverse local groups

National collectives for specific events.

e.g. TSEs of 1995, 1999, 2009, Transit of Venus, Comet ISON, etc.

There exists informal state-specific networks of groups

National Science Day (28 Feb) is celebrated widely. Those at GMRT and IUCAA are among the largest



ASI and the POEC

The Astronomical Society of India (ASI) is the primary association of professional astronomers in the country

- Started in 1972
- Over 600 life members
- Organises annual national meeting
- Confers awards, publishes bulletin etc

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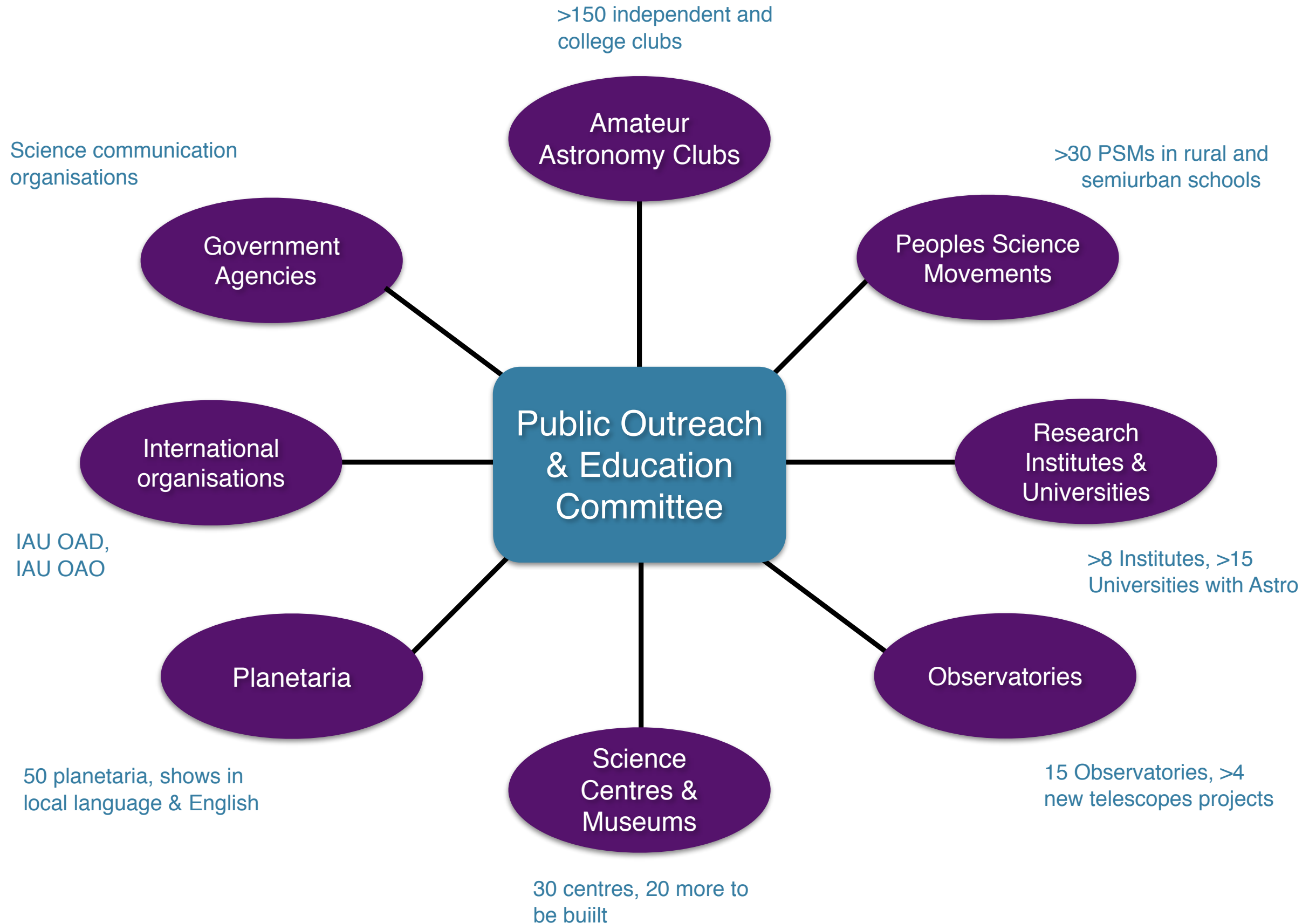
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The ASI set up the Public Outreach and Education Committee in 2014 with a mandate to promote astronomy awareness and interest in the country

The current POEC has 9 members with varied backgrounds

- 4 professional astronomers
- 2 planetarium directors
- 2 astronomy outreach persons
- 1 person in a science communication government organisation

POEC - Stakeholders



POEC - activities

The POEC undertakes a wide variety of activities

- Creation of **resource material**
- Facilitating national **campaigns**
- Maintaining active **social media** presence
- Forming regional **networks** of various kinds of stakeholders
- Engaging with professional **astronomers** and institutes
- Highlighting ongoing **research** and astronomy projects
- Facilitate an **outreach component** to every professional meeting
- Engaging with **students** at various levels
- Building a relationship with the **media**
- Engaging with **inter-disciplinary** collaboration
- Promoting astronomy as a **career** and as an interest
- Highlighting Indian outreach activities **internationally**

POEC : Resource Material

Creating resource material

- Content created by POEC
- Use external designers
- Translate when feasible
- Online under Creative Commons License

Launch of ASTROSAT (Sep 2015)

Poster set of 50 on
astronomy (2016)

Transit of Mercury (May 2016)

Time & position measurement (2017)

Zero Shadow Day (ongoing)

Trappist-1 comic (ongoing)

POEC : National Campaigns

National Campaigns

A campaign is usually organised around a celestial events, aimed mainly at school students and their communities

This is done with the help of local science communication groups (Peoples Science Movements) in local languages, with some national coordination

Typically reaches 10^3 - 10^4 science communicators and 10^5 - 10^6 students

Initiate and lead campaigns

Transit of Mercury 2016

Zero Shadow Day
(ongoing)

Festival of Measurement
(ongoing)

Participate in campaigns

ASTROSAT Outreach

Grav waves discovery
event

Asteroid occultation

POEC : CROP

Comprehensive Regional Outreach Program in Astronomy (CROP)

The annual meeting of the ASI is hosted in a different city each year

The POEC organises a host of outreach and education programmes in the region where the meeting is held, with a network of local stakeholders, to

- enable the meeting to have local relevance and utility
- leave behind a legacy of astronomy in the region
- continue interaction with the local stakeholders in the future

We have been organising this programme for every meeting since our formation



POEC: Roadmap for the future

Building networks of stakeholders

- Newsletter
- State-wise whatsapp groups
- Social media

Programs for students

- Career brochure
- Event based campaigns
- ASTROSAT Pic of the Month

Involving astronomers

- Liaise with the media
- Research News
- Facilitate public talks

International collaboration

- IAU OAD & ROADS, OAO
- UNAWE
- Neighbouring countries

Multilingual resource material

- Comics
- List of low cost books
- Poster, tutorials, handbooks

Education and pedagogy

- Teacher Training Workshops
- W/S on astro experiments
- Festival of Measurement

National campaigns

- Zero Shadow Day
- Annular eclipse Dec '19, Jun '20
- IAU 100 yrs, 50 yrs Moon landing

Publications

- Papers in refereed journal
- Reports of activities
- Articles in the media

Towards a BRICS Initiative

Astronomy EPO and BRICS

Astronomy is one of the 5 key areas identified in the BRICS STI Ministerial Meeting

The **mission** of the BRICS Astronomy Working Group is to promote cooperation between BRICS member countries in the field of astronomy and enabling technologies through joint activities of government, universities, research institutions, and industry, as relevant, in order to develop astronomical sciences, generate new knowledge, **train human capital**, develop new technologies and applications, **and improve public understanding of science.**

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- Astronomy is recognised as a gateway science, with an ability to enthuse young children in science in general
- Astronomy holds a fascination among everyone in the general public, and is a part of culture and history of all civilisations

Astronomy EPO and BRICS

All 5 BRICS countries share

- A strong emphasis on science education as a part of their development agenda
- A history of promoting scientific literacy
- An impressive tradition of ancient astronomy
- An active astronomy research community
- A vibrant astronomy Education and Public Outreach (EPO) community

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Given the global nature of astronomy and the similarities between the STEM education needs of our countries,

Evolving a common BRICS astronomy education and public outreach program will build on our strengths

Feedback from BRICS EPO personnel

Informal feedback on ongoing activities was received from some BRICS astronomy EPO personnel. This is an incomplete list, and communication was on an unofficial basis

Gustavo Rojas (Brazil)

- Federal University of Sao Carlos, Brazil
- EPO Advisor to Brazilian Astronomical Society (SAB)
- ESO Science Outreach Network contact
- Coordinator, SPANET EPO

Dmitri Wiebe (Russia)

- Institute of Astronomy of Russian Academy of Sciences
- National Outreach Contact, IAU OAO

Luis Crispino (Brazil)

- Head, Astronomy Nucleus, Federal University of Para
- Member, Committee for Scientific Outreach, CNPq

Kirill Maslennikov (Russia)

- Pulkova Astronomical Observatory
- ESO Science Outreach Network contact

Yiping Wang (China)

- National Astronomical Observatories

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Sivuyile Manxoyi (South Africa)

- Manager, SALT Collateral Benefits Program

Thembele Mantungwa (South Africa)

- Public Outreach and Communications Officer, SAAO

Lorenzo Raynard (South Africa)

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- Positive response to a possible BRICS-wide astronomy EPO proposal
- Details of EPO activity in each country and ideas for collaboration

Commonalities between existing work

Some ongoing activities that are common to BRICS countries are

Public science and
astronomy festivals

Public quizzes, contests

(Brazilian Week of S&T, Astrofest and Sibastro in Russia, SciFest in Grahamstown, National Science Day in India)

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Supporting amateur
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Motivated school students

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Motivated school students

Teacher Training
Workshops

Observatory visits

Astronomy Olympiads

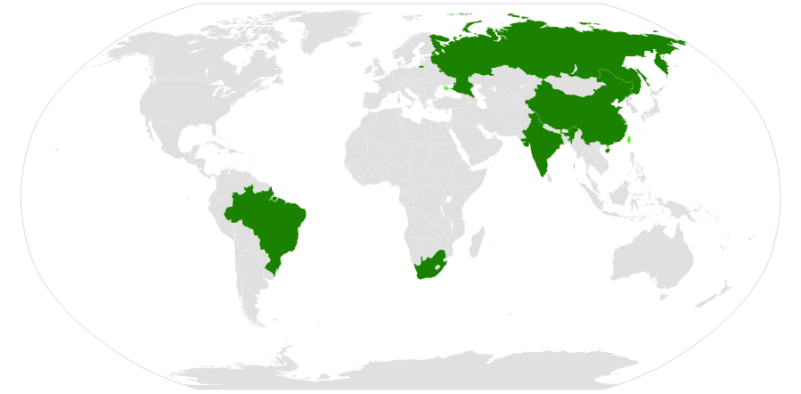
Commonalities in BRICS

There are many shared contexts in Astronomy

Latitude and longitude

Latitude : Brazil and South Africa

Longitude : India, China and Russia; Russia and South Africa



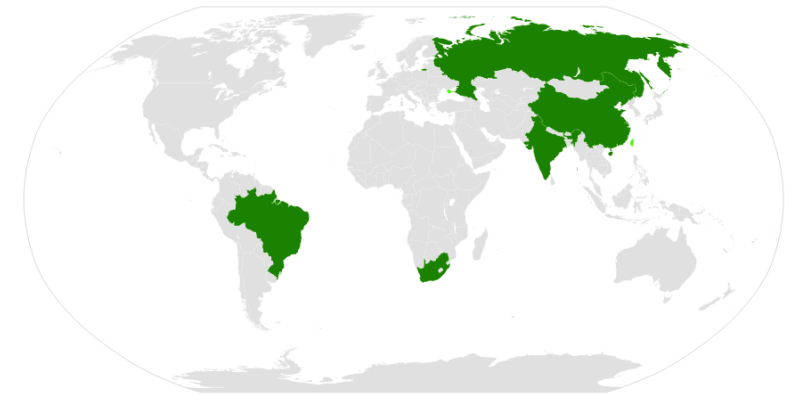
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Megaprojects

SKA : South Africa, India and China (with participants from Russia and Brazil)

TMT: India and China

LIGO Scientific Collaboration : India, China, Brazil, Russia



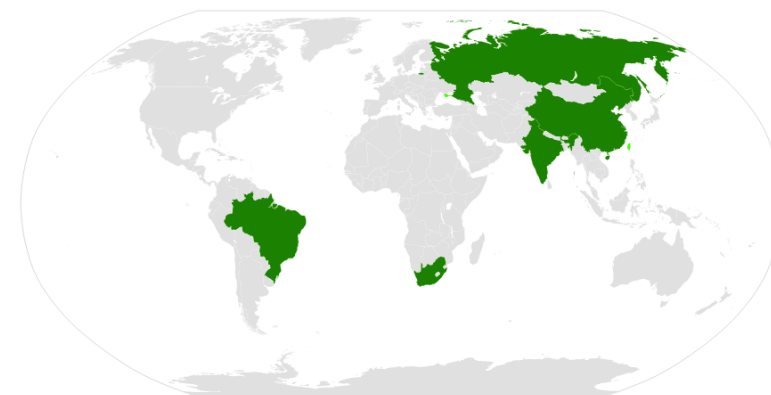
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Upcoming celestial events

Transit of Mercury, 11 Nov 2019 : Brazil, South Africa

Annular Solar Eclipse, 26 Dec 2019 : India, China, parts of Russia

Annular Solar Eclipse, 21 Jun 2020 : India, China, parts of Russia & South Africa

What can be done together?

Create common platform to share resource material

School Teacher Training Workshops

Simple experiments in astronomy for school children

Common celestial events and astronomy campaigns

Films, travelling exhibitions on common projects



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Exchange resource persons

Developers of pedagogical tools and kits

Astronomy educators and communicators

Joint planning meetings and outreach workshops



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Space science and technology

All BRICS have some degree of space science capacity

Great interest among students, esp nano-satellites



What can be done together?

Network for global projects

IAU 100 years 2019

50th anniversary of Moon Landing, 2019

Eclipses, transits, occultations, etc



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Joint large-scale projects

Pair schools on same lat/long for simultaneous expt.s

Measuring Earth's diameter, timing celestial events etc

Shared skies, cultural astronomy

Network the amateur astronomy groups in all countries

Programs like the Lindau Meeting



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Astronomy and Development

Work with IAU OAD to use astronomy to promote development goals

Use cutting edge astronomy techniques for socio-economic problem solving

Techniques for astronomy equity and inclusion

Summary

- Every BRICS country has a vibrant astronomy EPO community
- Many activities are in common, many are unique
- Immense scope and interest for sharing knowledge and learning from each other
- Uniting the people of our five countries through our shared skies is in the spirit of BRICS
- We look to the BRICS STI and Astronomy WG to facilitate this process

National campaigns - Transit of Mercury 2016

The ToM occurred on 9 May 2016 on the first day of the annual ASI meeting

We wrote a handbook on the transit,
and made it freely available online

We broadcast the transit live, online,
and facilitated 6 other broadcasts
from across the country

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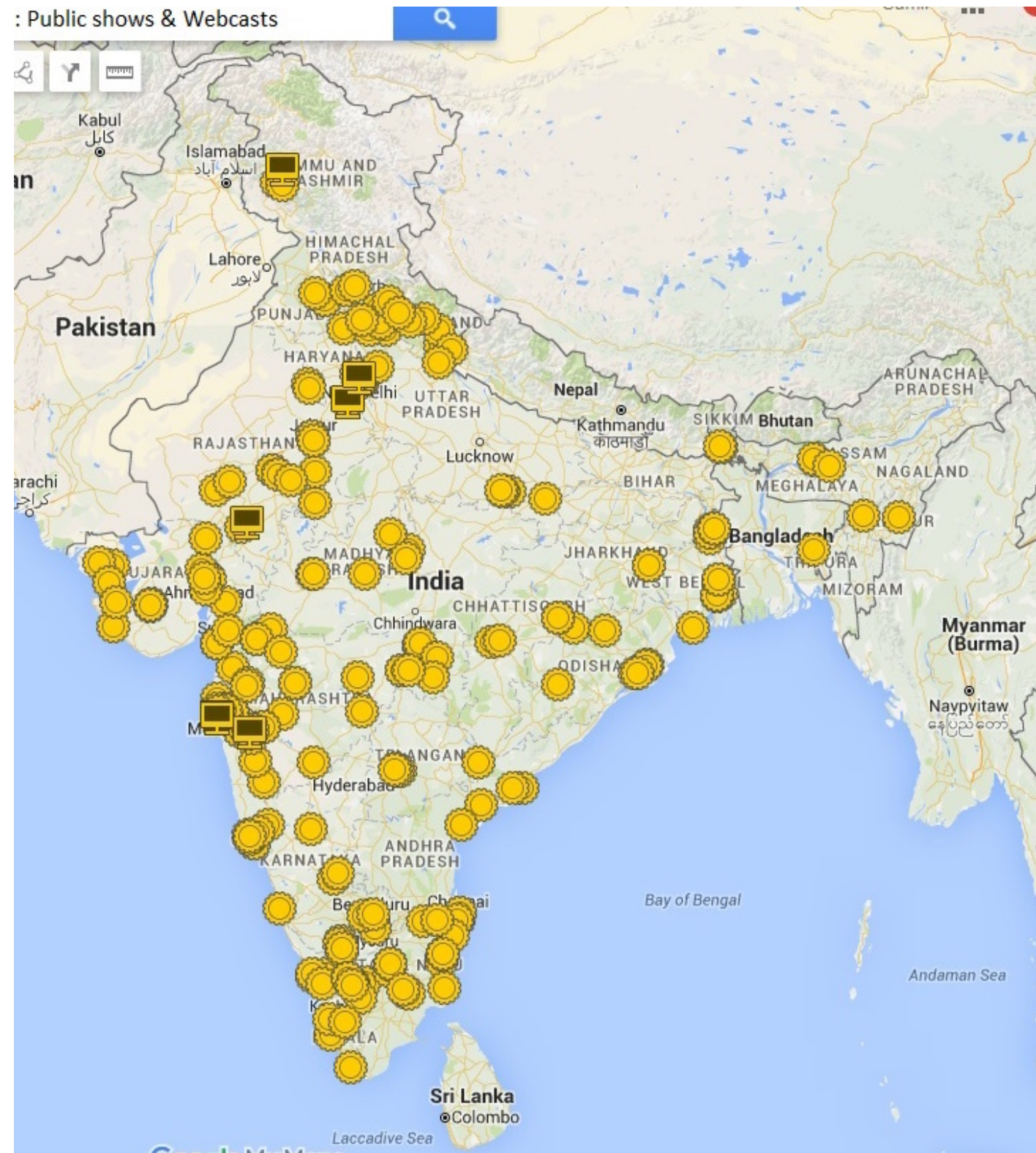
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We crowd-sourced public telescopic observations by an open call to amateur astronomers

250 amateurs responded, and hence >75000 people saw the ToM this way



POEC : CROP

“Astronomy in the Valley”

May 2016 in Kashmir during the ASI meeting in Srinagar

- Teacher Training Workshop on basic astronomy
- Astronomy Clubs in every DIET using telescopes donated by IIA
- Session on ‘careers in Astronomy’ for college students in Srinagar
- Webcast Transit of Mercury, public event
- 18 popular talks by astronomers in local schools and colleges
- Information stalls by research institutes
- Rajya Sabha TV coverage of meeting
- Radio show on the night sky in Urdu
- Summaries of ASI talks on social media

“Rajasthan Astronomy Festival

Feb 2017 in Rajasthan during the ASI meeting in Jaipur

- Teacher Training Workshop on basic astronomy
- Rajasthan Astrophotography Contest
- Hands-on Festival of Measurement at Jantar Mantar
- Astronomy art competition for school and college students
- Astrophotography public exhibition
- Rural astronomy events in schools
- Public talk on the history of Jantar Mantar
- Rajya Sabha TV filming of ASI speakers