The Power of TROPOMI to bridge African science and policy.
*TROPOMI satellite data as a tool for setting Scientific and Socio-Political agendas in Africa for green growth and improved wellbeing*

Goal of the workshop:
- Demonstrate the potential of Satellite Data and understand the challenges in data use
- Joint identification of potential measures and monitoring capacity with societal impact using already available satellite data
- Co-create the research agenda for TROPOMI in Africa with a potential to inform national policies;

**11 April 2022**
*Objective: Setting the scene: science and policy insights for Africa.*

9.30-10.00 Walk in

10.00-10.10 **Welcome and opening by Lorentz Center**

10.10-10.20 **Inspiration, Introduction and Invitation by Pieternel and Marleen**
What brings us here, what do we want to achieve, who are we (as a group of participants) and practical ways of engaging with each other online/offline this week [using Padlet, will include taking notes re: (1) identifying possible research/policy questions and (2) concepts that have different meanings across the disciplines] Where are we headed, what objectives do we want to achieve?

10.20-10.40 **Plenary talk #1 Kick-off keynote speaker introducing climate change and air quality issues in Africa by Dr. Alice Kaudia, UNEP**
[open to broader online audience, to be recorded]

10.40-11.00 **Plenary talk #2 Context setting science overview talk by Deborah Stein Zweers (KNMI)**
Workshop programme

[open to broader online audience, to be recorded]

Content: The use of satellite data in Africa and opportunities and barriers for using satellite data for social science research and research for policy-making

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<th>Event</th>
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<tr>
<td>11.00-11.20</td>
<td><strong>Plenary talk #3 Context setting policy overview talk by Agnieszka Kazimierczuk or Marleen Dekker (ASCL)</strong>&lt;br&gt;Content: Key policy issues related to green and inclusive growth and current use and needs for using satellite data for policy making in Africa</td>
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<td>11.20-12.00</td>
<td>Guided/focused Q&amp;A session: <em>Slido will be used for raising &amp; handling online questions</em></td>
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<td>12.00-13.30</td>
<td><strong>Lunch/Health break</strong></td>
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<td>13.30-14.00</td>
<td><strong>Summary morning session and transitioning to break out groups by [NAME]</strong>&lt;br&gt;● Highlights&lt;br&gt;● First look at the questions/concepts&lt;br&gt;● setup for breakout sessions and transitioning to break-outs</td>
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<td>14.00-15.00</td>
<td><strong>Get-to-know each other break out and brainstorm session on policy issues that can be addressed with TROPOMI data [ 5 moderators, to do: develop protocol]</strong>&lt;br&gt;Content: Personal introductions (max 10 mins), Guided brainstorm session to unpack <strong>Policy Problems</strong>, <strong>Pathways to address them</strong> and <strong>Possibilities to use TROPOMI data</strong>: post-it idea mapping etc. including identifying different ways concepts are used or communicating in social and natural sciences and policy.</td>
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<tr>
<td>15.00-15.30</td>
<td><strong>Break</strong></td>
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Workshop programme

15.30-16.00  Reporting back to plenary: moderated by [NAME]
Each break out group reports back on the key topics discussed (5 mins)

16.00-16.30  Lightning round: introduction of junior researchers to pitch the poster sessions; introduced by [NAME]
[3 minutes & 3 slides per researcher, with max 10 researchers, actual number of researchers may be less]

16.30-17.15  Virtual poster session (especially for highlighting junior researchers, but all contributions welcome)

17.15-17.30  Conclusion presentation with setup for Day 2

17.30-   Wine & Cheese party

12 April 2022
Objective: Presentation of case studies and joint identification of gaps through deep dive and brainstorming activities. Bringing together pre-defined, mature case studies and new, innovative ideas from young researchers - a day to highlight and think about how we can start to bridge science and policy.

9.00-9.30  Walk in with housekeeping announcements etc.
9.30-9.40  Opening and welcome, programme of today [Deborah or Aggi or other]

9.40-10:05  Plenary Case Study # 1 South Africa illustrates TROPOMI’s Capabilities [Rebecca?]  
[online streaming; as fully developed during preparatory phase]

10.05-10.15  Moderated group discussion / OR just Clarifying Questions - allows a few minutes for transition
Content: First clarifying questions then identification of similar ideas, issues & ways the methods used in case study can be applied

10.15-10.35:-40  Plenary Case Study #2 - Ugandan/Kampala Case Study highlighting opportunities for satellite and ground-based measurements for urban air quality management  [Presenter: someone from AirQO team]
[online streaming; as fully developed during preparatory phase]
Workshop programme

10.35-:40-10.50  **Moderated group discussion**  
**Content:** First clarifying questions then identification of similar ideas, issues & ways the methods used in case study can be applied

10.50-11.20  Health break

11.20-11.40::45  **Plenary Case Study #3**  - Ethiopian Case Study highlighting impacts of air quality on agriculture, TROPOMI measurements of the biosphere and tropospheric ozone [presenter: Anteneh and/or team presenter]  
[online streaming; as fully developed during preparatory phase]

11.45-12.00  **Moderated group discussion**  
**Content:** First clarifying questions then identification of similar ideas, issues & ways the methods used in case study can be applied

12.00-13.30  Lunch/Health Break

13.30-13.45  Logistics and setup of brainstorm activity [Deborah (or other) to introduce the Exercise and hand out outline of possible research questions]

13.45-14.30  **Interactive Deep Dive Session(s)**  - **Exercise for Core Group with online space for contributions**  
[5 groups of 8 people or 3 larger groups lumped by Case Study; hybrid setup to allow interested online participants]  
**Content:** Break out sessions diving deeper into the case studies, to brainstorm on topics that can be studied (e.g. to co-create the research agenda);

14.30-14.45  Returning back to plenary and reporting from each group on their findings

14:45-15:00  Quick break for group & also for panel members to summarize & synthesize group findings

15.00-15.45  **Moderated panel discussion with all researchers present for group and/or individual questions exploring possible thematic links to case studies**  [Panel = plenary and/or case study speakers]  
**Logistics:** start with one central question from social science, natural science, policy; start with one central question and then open up for the audience (with some
back up questions from our side; What will come out? Goal: The beginnings of where the gaps are. Stimulating people to put the dots together; **TBD rapid fire interactive session regarding how satellite data can and can’t be used**

15.45-16.00  Close the session, preview of Public Lecture and Day 3

16.00-16.30  Departure to Public event Boerhaave by bike, public transport or taxi
16.30        Arrival @Boerhaave + start guided tour
17.30        Coffee/tea
17.45        Start public lecture by Pieter Nel Levelt, welcome by Boerhaave
18.45        Drinks
Workshop programme

13 April 2022

Objective: Presentations from both science and policy sides to better understand what type of data we use and how we visualize and analyse it. Day 3 is an opportunity to better understand what type of information is available and to identify common and missing links between science and policy data, metrics, visualizations and communication thereof.

9.00-9.30 Walk in
9.30-9.40 Opening and welcome, Housekeeping, Recap of Day 2, programme of today
Facilitators/organizers will present. This will be open to core group.

9.40-9.45 Logistics for interactive group exercise: Core group only
Facilitators/organizers present this. The break-out groups will be decided already by the organizers. Groups will be a mix of in-person and virtual attendees, with a mix of expertise. The questions for each group will be the same.

9.45-10.15 Interactive coffee exercise to get the day started: Core group only
Content: aim is to describe the datasets we use and the metrics we communicate in high level reporting (this exercise will partly rely on the survey distributed to participants prior to the workshop).
Groups will be mixed with science and policy members with the goal of comparing and contrasting common data sources and metrics. Barriers to data access and policy influence should also be named.

Information will be captured in a document a shared drive (e.g. access to a pre-made google doc/presentation, - depending on what we use).
There will be 3-6 questions for each group to talk through. The questions will be refined from the survey, but potential questions include,

- If you have to describe the air quality for your country/region/etc., where do you get your data and information from? Which metrics do you use?
- Are the available data sources and metrics sufficient for your needs?
- What are common metrics used across different stakeholder groups? What are differences?
- Gaps
Workshop programme

10.15-10:25 Recap of findings: **Core group only**

10.30 - 10:50 Health break and move to plenary:

10.50-11.10 **Data Management and accessibility from a Policy Perspective, Plenary talk #4 [TBD, open to broader online audience, to be recorded]** - TBD, World Bank contact (Marleen to check)
Content: A layman presentation explaining what data relevant from a policy perspective is there and what information can be retrieved, including possible challenges for accessibility; what are the questions what are the gaps?

11.10-11.30 **Data Management and accessibility from a Science Perspective, Plenary talk #5 EUMETSAT, Frederico (confirmed) [open to broader online audience, to be recorded]**
Content: A slightly more technical overview of the types of data and visualization available as well what platforms that can be used to access this data. A description of how EUMETSAT approaches making data accessible and how they help build capacity.

11.30-11.50 **Bridging the gap: summary of current gaps and common metrics, Plenary talk #6: Ilse Aben, TBC; possible tag team with an African based participant eg. F. Osei (U Twente, Ghana) [open to broader online audience, to be recorded]** TBC, Presentation to be given by Ilse Aben re: methane pledge, links to policy (methane pledge), NGOs, small satellite community and industry.
Content: This plenary will synthesize gaps and commonalities in science and policy data sources and methodologies in part, using inputs from recap of the morning interactive session. [logistics of recap to be finalized]

11.50-12.00 Discussion on three plenaries

12.00-13.30 **Lunch/Health Break**

13.30-13.45 **Energizer Activity to start the afternoon session and logistics break out session - core group only** - core group only
A team building, something activity here: help please!

13.45-15:00 **Choose your own breakout session on scientific data (Core Group).** People can also set up side meetings with those they want to talk with. We should have a way to facilitate these side meetings being made. Also, if they are between one person onsite and one virtual, we would need zoom rooms for them to connect. These will have to be breakout groups that are available in person and online. The presenters can be online or in person. People can go to whichever group they are most interested in. (additional option of J. de Gouw, ‘What is an artefact?’ talk to be made accessible)

**Content:** Hands-on breakout sessions will be available on varying technical levels to demonstrate how the scientific data can be accessed and used, to be recorded where possible. *[Logistics (room usage, computer access etc) to be finalized with presenters, organizers & Lorentz center]*

- Where possible, case studies presented on day 2 will be used as a lens to illustrate in more detail on a technical level which data were used to create the case studies and what analytic methods were employed.
- An example of possible breakout sessions: a more technical Google Earth Engine (GEE) how-to session; or a more accessible map-making session for visualizing from city to national level, and guidance for how to identify air pollution sources and patterns, etc.)

**TROPOMI Data usage & visualization sessions**
- Overview of EUMETSAT tools & training modules for learning how to work with TROPOMI data -- Federico
- How to use TROPOMI data in Google Earth Engine - module Bram Maasakkers, SRON
- Basic TROPOMI data explanation including map making session for simple visualization from city to national level – Deborah, KNMI (based on introductory module work done in conjunction with SRON)

15.00-15.30 Health Break

15.30-15.50 **Plenary presentation on common barriers to data access: African speaker? TBC, possibly Oksana Tarasova WMO**
Workshop programme

**Content:** Presentation designed to name and address common barriers to data access and also how to address them. This presentation is based in part on survey results collected from participants prior to the workshop. If Oksana from WMO, then can be from their experiences

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<td>15.50-16.30</td>
<td>Facilitated discussion on data access with participants. This can also pull from thoughts people had from hands-on sessions. What could be possible access issues for you to do this analysis at home? What would be needed to address this access issue? FAIR principles help? Article here: <a href="https://www.nature.com/articles/sdata201618">https://www.nature.com/articles/sdata201618</a> could be a reading that we provide before for people. Also, introduce FAIR here (if Oksana doesn’t) (including FAIR)</td>
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<tr>
<td>16.30-16.45</td>
<td>Closing for the day and looking ahead to tomorrow, logistics for dinner</td>
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<td>16.45-18.30</td>
<td>Networking: organising theme to synthesis to identify topics and groups</td>
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<td>19.00</td>
<td>Workshop dinner</td>
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Workshop programme

14 April 2022

Objective: Day 4 is about setting the stage for follow-up work. We will work together towards a joint research agenda and connect identified research priorities (short-term and long-term) to funding opportunities.

9.00-9.30  Walk in

9.30-9.40  Opening and welcome and Housekeeping by [Hester B. TBC], Recap of Day 3, programme of today

9.40-9.50  Synthesis of ideas on research agenda - Logistics and introduction to the exercise

9.50-11.00  Brainstorming session on research agenda in subgroup(s)  
[4 to 6 groups]
Content: Create topic-based work group sessions to further brainstorm about the ideas identified on Monday (and later on in the week). Discuss whether the ideas are short vs. long-term, to what extent to priorities advance science agendas, policy agendas or both. Rate and stratify research agenda items by their urgency and feasibility.

Group 1: Topic 1  
Moderator: [NAME]

Group 2: Topic 2  
Moderator: [NAME]

Group 3: Topic 3  
Moderator: [NAME]

Group 4: Topic 4  
Moderator: [NAME]

Group 5: Topic 5  
Moderator: [NAME]

11.00-12.00  Reconvene and reporting back to the plenary. Moderated by [NAME]
Workshop programme

**Content:** Use a charting tool to compare priorities as well as urgency and feasibility ratings.
**Expected outcome:** joint agreement on the first draft of the research agenda

12.00-13.30 **Lunch/Health Break**

‘AMERICAN AFTERNOON’

13.30-15.00  What is happening in the States re AQ in Africa (programme will follow)

15.00-15.30  Health break

15:30-17:00  Moderated panel discussion to highlight most common issues for African policy and science users key questions based on research agenda highlights. What is preventing the bridging is not knowing what questions to ask AQ: practicalities of interaction with cities and governing bodies. How to reach out to policy makers and vice versa.

Panelists:
Dr. Madina Guloba (EPRC Uganda)
Dr. Abebe Shimeles (AERC)
Dr. Caradee Wright (South African Medical Research Council leading the Climate and Health Research Programme) - confirmed
Kitty van der Heijden (DGIS?)
FMO: Name?

17.00-17.15  Closing of Day 4 and logistics Day 5.
Workshop programme

15 April 2022: At KNMI

Objective: Agreeing on the way forward. Setting up timelines for funding opportunities and creating a preliminary agenda and time planning for the follow-up meeting(s).

Organised bus travel from Leiden to KNMI

10.00-10.10   Opening and welcome,

10.10-10.45   Interactive coffee session
   Content: Networking and recap results from Day 4

10.45-11.00   Plenary pitch presentation of the jointly developed research agenda

11.00-11.30   Break out session(s)
   Content: Discuss the research agenda and prioritize how to fill in gaps

11.30-11.45   Reporting from each group on their findings

11:45-12:00   15 minutes Break

12.00-12.15   Overview of funding opportunities by Agnieszka Kazimierczuk, Plenary talk #7
   Content: This plenary will contain an overview of relevant funding opportunities available on a national, EU, and/or international level coming from science-based, policymaking, and/or NGO avenues.

12.15-13.15   Connect the dots session in groups
   Content: Interactive session to connect research agenda ideas to funding opportunities keeping stakeholder interests in mind.
   Expected outcome: creation of 2-3 research consortium that is committed to pursue an identified funding opportunity. A leader per consortium is also identified and agreed upon.
Workshop programme

12.45-13.00 Reporting from each group; agreeing on timelines and preliminary agenda for the follow-up meeting

  Group 1: Partnership for research idea 1
  Moderator: [NAME]

  Group 2: Partnership for research idea 2
  Moderator: [NAME]

  Group 3: Partnership for research idea 3
  Moderator: [NAME]

  Group 4: Partnership for research idea 4
  Moderator: [NAME]

12.15-12.45 Break out session(s)
  Content: Interactive session in sub-groups to discuss identified funding opportunities and formalize work groups for these follow-up opportunities including how to finalize our research agenda white paper

13.00-14.00 Lunch/Health Break

14.00-14.45 Tour of KNMI

14.45-15.00 Closing remarks

For interested core participants (in person and online) we will provide afternoon work group sessions for wrap-up brainstorming and planning. A taxi to the airport from KNMI can be arranged.
Workshop programme