

ARSET

Applied Remote Sensing Training

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 @NASAARSET

Conjunto de datos de PM_{2.5} de la OMS Análisis de estudio de caso

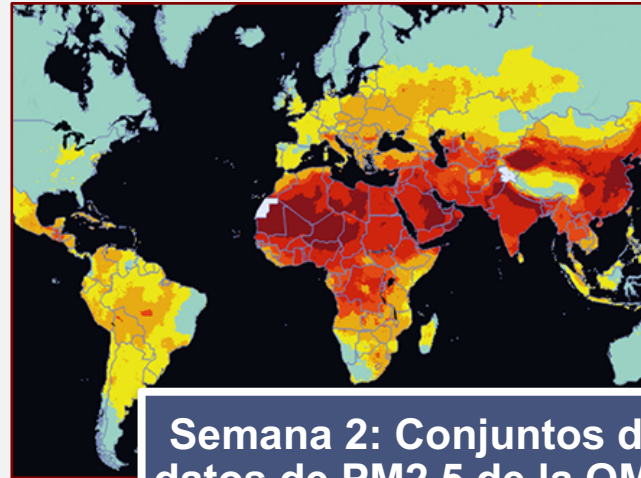
15 al 29 de marzo de 2017

Melanie Follette-Cook, Pawan Gupta

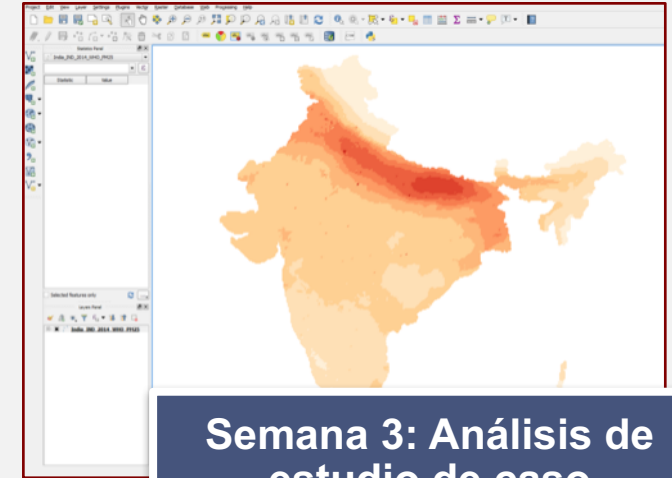
Agenda de cursos en línea



Semana 1: ARSET, percepción remota y SDGs*



Semana 2: Conjuntos de datos de PM2.5 de la OMS



Semana 3: Análisis de estudio de caso

*SDG- siglas de “objetivo de desarrollo sostenible” (sustainable development goal) en inglés

Sesión 3: Reseña

1. Breve repaso de dónde obtener archivos de datos
2. Visualización y análisis de estimaciones de la OMS con la programación QGIS
3. Repaso de otros portales de datos y páginas en línea relevantes

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Objetivos de aprendizaje

1. Aprender cómo obtener, visualizar y analizar las estimaciones de $PM_{2.5}$ de la OMS usando la programación QGIS
2. Aprender acerca de otros portales de datos y páginas en línea informativas

A world map is shown in the background, with a semi-transparent white rectangular box overlaid on the center. The map uses a color scale from light yellow to dark red to represent different data points across the globe. The white box contains the text 'Repaso de las sesiones 1 y 2' in a black, sans-serif font. A thin black horizontal line is positioned below the text, extending across most of the width of the box.

Repaso de las sesiones 1 y 2

Objetivos de desarrollo sostenible de la ONU (SDGs)

Transformar nuestro mundo: la Agenda 2030 para el Desarrollo Sostenible



Text adapted from "[Transforming our world: the 2030 Agenda for Sustainable Development](#)"

Objetivos de desarrollo sostenible de la ONU (SDGs)

Transformar nuestro mundo: la Agenda 2030 para el Desarrollo Sostenible

Meta 3.9

De aquí a 2030, reducir considerablemente el número de muertes y enfermedades causadas por productos químicos peligrosos y por la contaminación del aire, el agua y el suelo



Meta 11.6

Para 2030, reducir el impacto ambiental negativo per cápita de las ciudades, incluso prestando especial atención a la calidad del aire y la gestión de los desechos municipales y de otro tipo

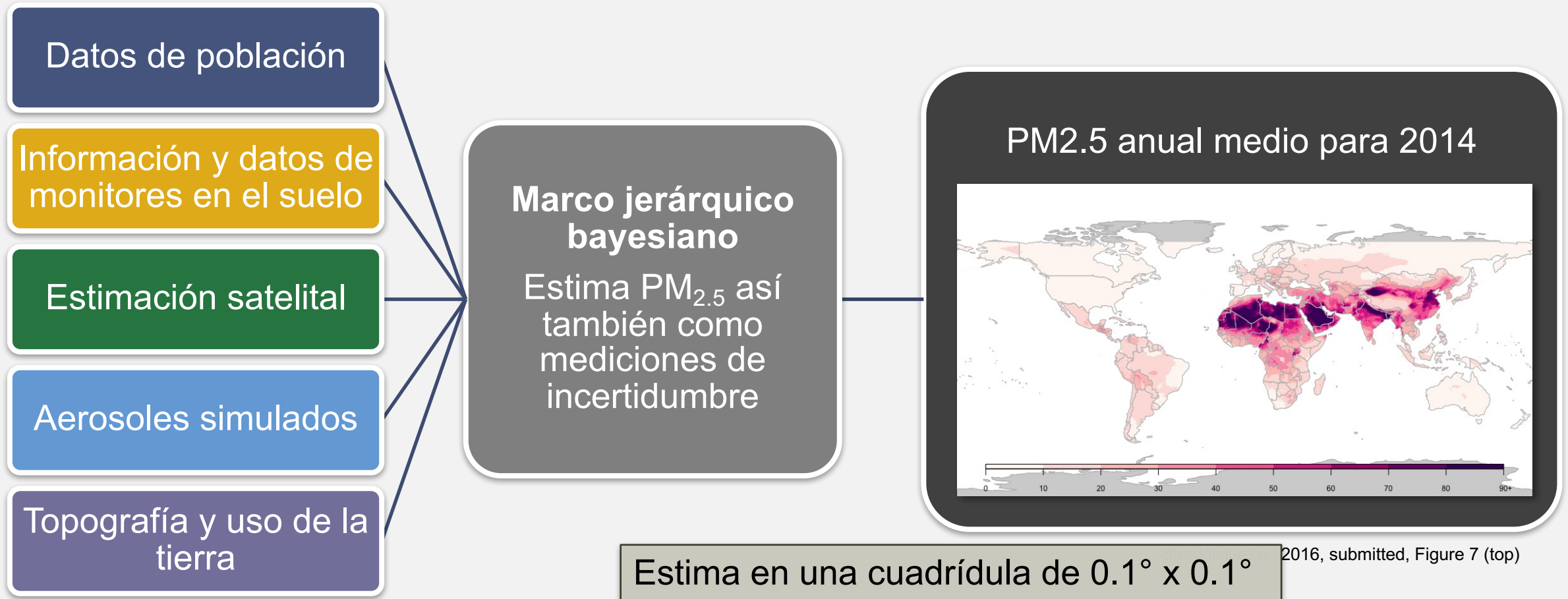
Un indicador para ambas metas son los niveles medios anuales de partículas finas (PM_{2.5})

Text adapted from "[Transforming our world: the 2030 Agenda for Sustainable Development](#)"

Estimaciones mundiales de PM_{2.5}

- Van Donkelaar et al. 2016
 - Estimaciones anuales medias de PM_{2.5} (1998-2012)
 - Disponibles en: <http://sedac.ciesin.columbia.edu/data/set/sdei-global-annual-avg-pm2-5-modis-misr-seawifs-aod-1998-2012>
 - O en: http://fizz.phys.dal.ca/~atmos/martin/?page_id=140
- OMS y la Universidad de Bath - Modelo de integración de datos para la calidad del aire (Data Integration Model for Air Quality o DIMAQ)
 - Modelo desarrollado para estimar PM_{2.5} incorporando muchas fuentes de datos
 - Estima PM_{2.5} junto con niveles de incertidumbre asociada
 - Estimaciones medias anuales de PM_{2.5} (sólo 2014)
 - Disponible en: http://www.who.int/phe/health_topics/outdoorair/databases/modelled-estimates/en/
 - O por país en: http://avdc.gsfc.nasa.gov/pub/tmp/WHO_PM25_2014_COUNTRY_DATA/


Modelo de integración de datos para la calidad del aire (Data Integration Model for Air Quality o DIMAQ)



2016, submitted, Figure 7 (top)

Datos de PM_{2.5} de la OMS en cuadrícula – Por país

- http://avdc.gsfc.nasa.gov/pub/tmp/WHO_PM25_2014_COUNTRY_DATA/



The screenshot shows the NASA AVDC website interface. At the top, it displays the NASA logo and "GODDARD SPACE FLIGHT CENTER". A notification states "You are not logged in. Login Sign up". Below this is a banner for the "Aura validation data center" featuring a satellite and a globe. A navigation menu includes "OVERVIEW", "DATA", "TOOLS", "DOCUMENTATION", "LINKS", and "EVENTS". The main content area is titled "OVERVIEW/ HOME" and displays a directory listing of files. The listing has columns for "Name", "Last modified", and "Size".

Name	Last modified	Size
Parent Directory		-
Afghanistan_AFG_2014_WHO_PM25.csv	15-Feb-2017 10:32	220K
Albania_ALB_2014_WHO_PM25.csv	15-Feb-2017 10:32	11K
Algeria_DZA_2014_WHO_PM25.csv	15-Feb-2017 10:32	760K
Andorra_AND_2014_WHO_PM25.csv	15-Feb-2017 10:32	386
Angola_AGO_2014_WHO_PM25.csv	15-Feb-2017 10:32	375K
AntiguaandBarbuda_ATG_2014_WHO_PM25.csv	15-Feb-2017 10:32	761
Argentina_ARG_2014_WHO_PM25.csv	15-Feb-2017 10:32	1.0M
Armenia_ARM_2014_WHO_PM25.csv	15-Feb-2017 10:32	11K
Australia_AUS_2014_WHO_PM25.csv	15-Feb-2017 10:32	2.5M
Austria_AUT_2014_WHO_PM25.csv	15-Feb-2017 10:32	35K
Azerbaijan_AZE_2014_WHO_PM25.csv	15-Feb-2017 10:32	32K
Bahamas_BHS_2014_WHO_PM25.csv	15-Feb-2017 10:32	4.5K
Bahrain_BHR_2014_WHO_PM25.csv	15-Feb-2017 10:32	350
Bangladesh_BGD_2014_WHO_PM25.csv	15-Feb-2017 10:32	44K
Barbados_BRB_2014_WHO_PM25.csv	15-Feb-2017 10:32	317
Belarus_BLR_2014_WHO_PM25.csv	15-Feb-2017 10:32	99K
Belgium_BEL_2014_WHO_PM25.csv	15-Feb-2017 10:32	14K
Belize_BLZ_2014_WHO_PM25.csv	15-Feb-2017 10:32	6.8K
Benin_BEN_2014_WHO_PM25.csv	15-Feb-2017 10:32	34K
Bhutan_BTN_2014_WHO_PM25.csv	15-Feb-2017 10:32	13K

A world map with a semi-transparent white rectangular overlay box. The text 'QGIS' is written in black, bold, sans-serif font inside the box. Below the text is a solid black horizontal line. The map background shows a color-coded geographical distribution, with yellow and orange tones in the northern and southern regions, and red and brown tones in the central and eastern regions. The overlay box covers the Americas, Europe, and Africa.

QGIS

QGIS

- QGIS es un Sistema de información geográfica (Geographic Information System o GIS por sus siglas en inglés) de fuente abierta bajo la Licencia Pública General de GNU
- Esta programación ofrece muchas funciones comunes de los GIS:
 - Visualización de datos
 - Creación de mapas
 - Análisis, administración y exportación de datos
- Para mayor información ver: <https://www.qgis.org/en/site/about/>
- Manual del usuario de QGIS para v2.14: <http://docs.qgis.org/2.14/en/docs/index.html>

<https://www.qgis.org/en/site/about/>

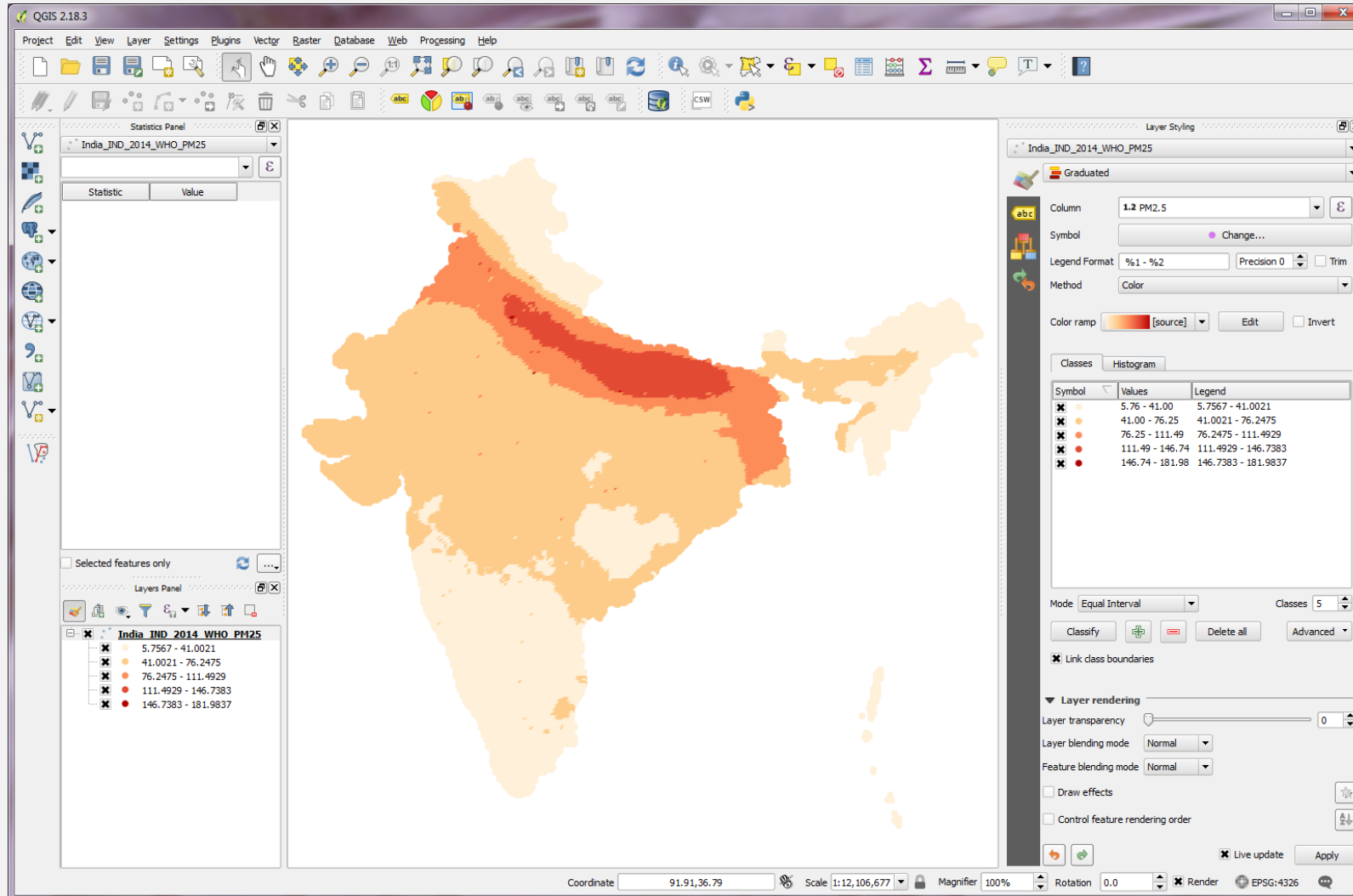
QGIS

<http://www.qgis.org/en/site/index.html>

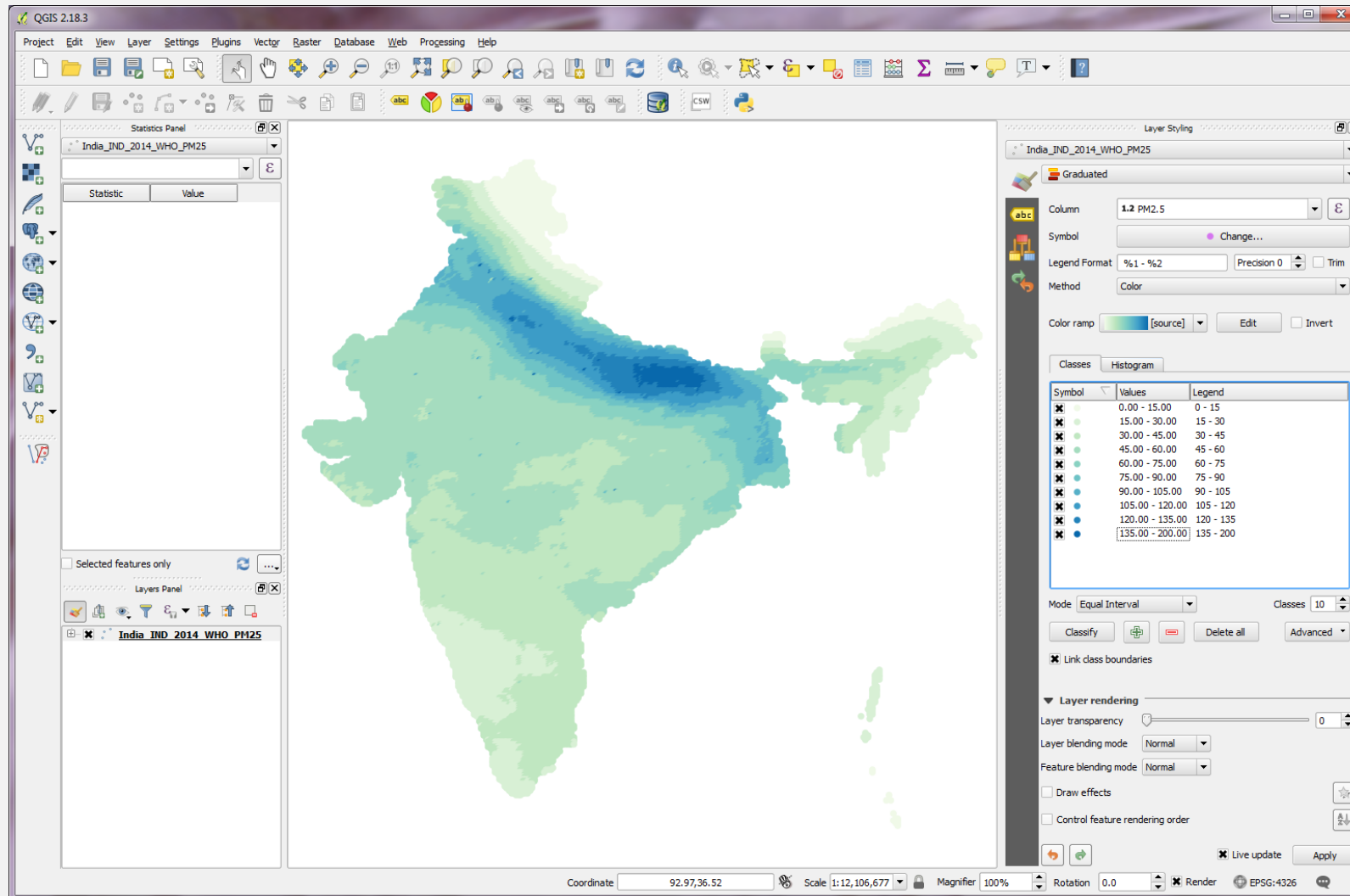


- Hasta la fecha, Ud. debe haber:
 - Descargado e instalado la programación de QGIS
 - Descargado por lo menos algunos o todos los archivos de países individuales
- En esta sección le guiaremos sobre cómo...

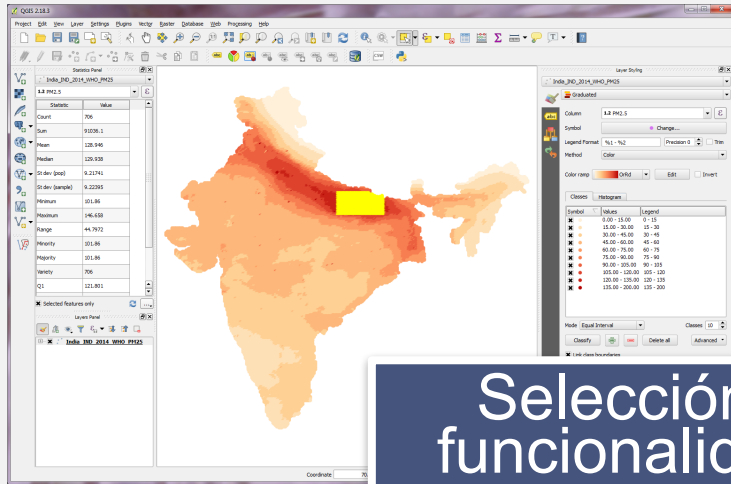
Cargar y visualizar las estimaciones de PM_{2.5}



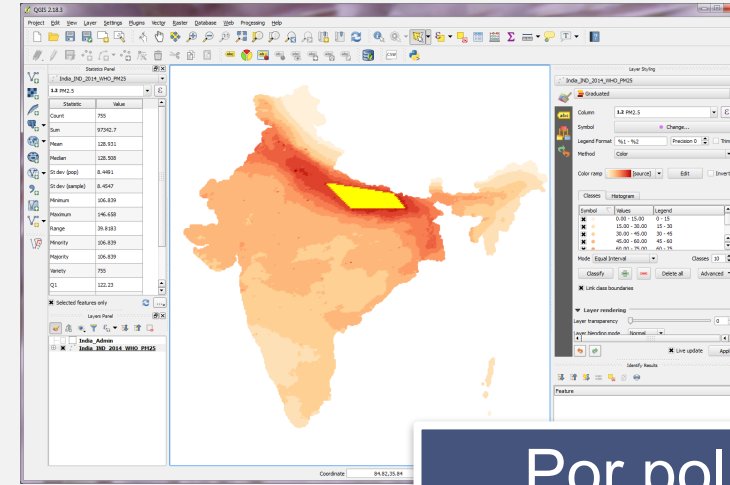
Cambiar el color y la escala cromática



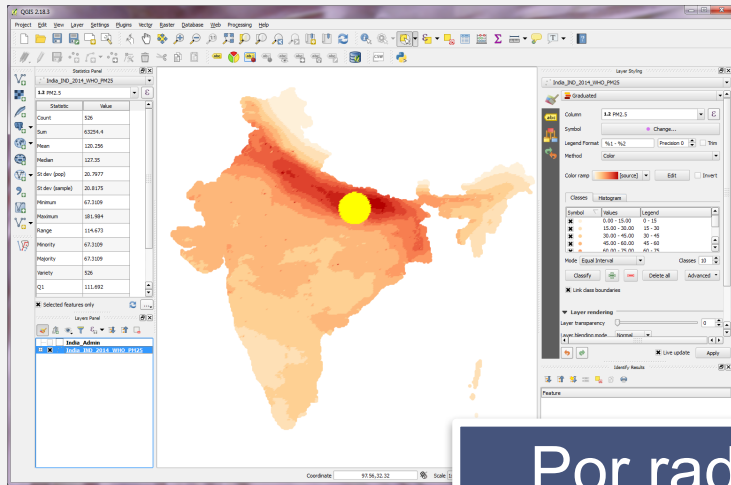
Crear y guardar un subconjunto de datos; calcular estadísticas básicas



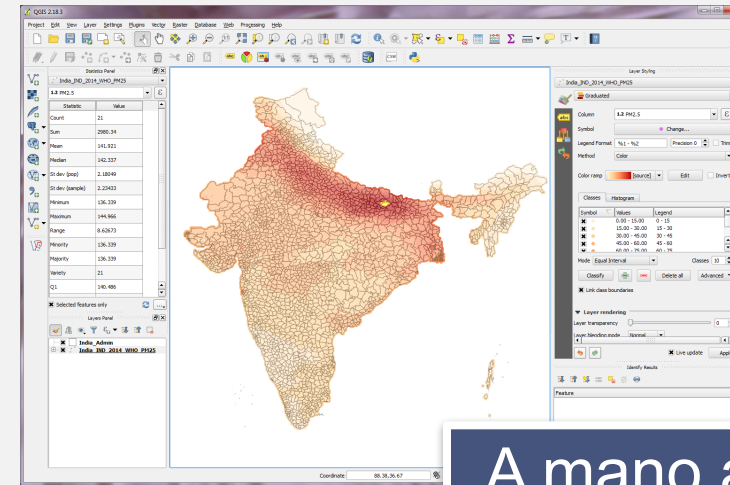
Selección de funcionalidades



Por polígono

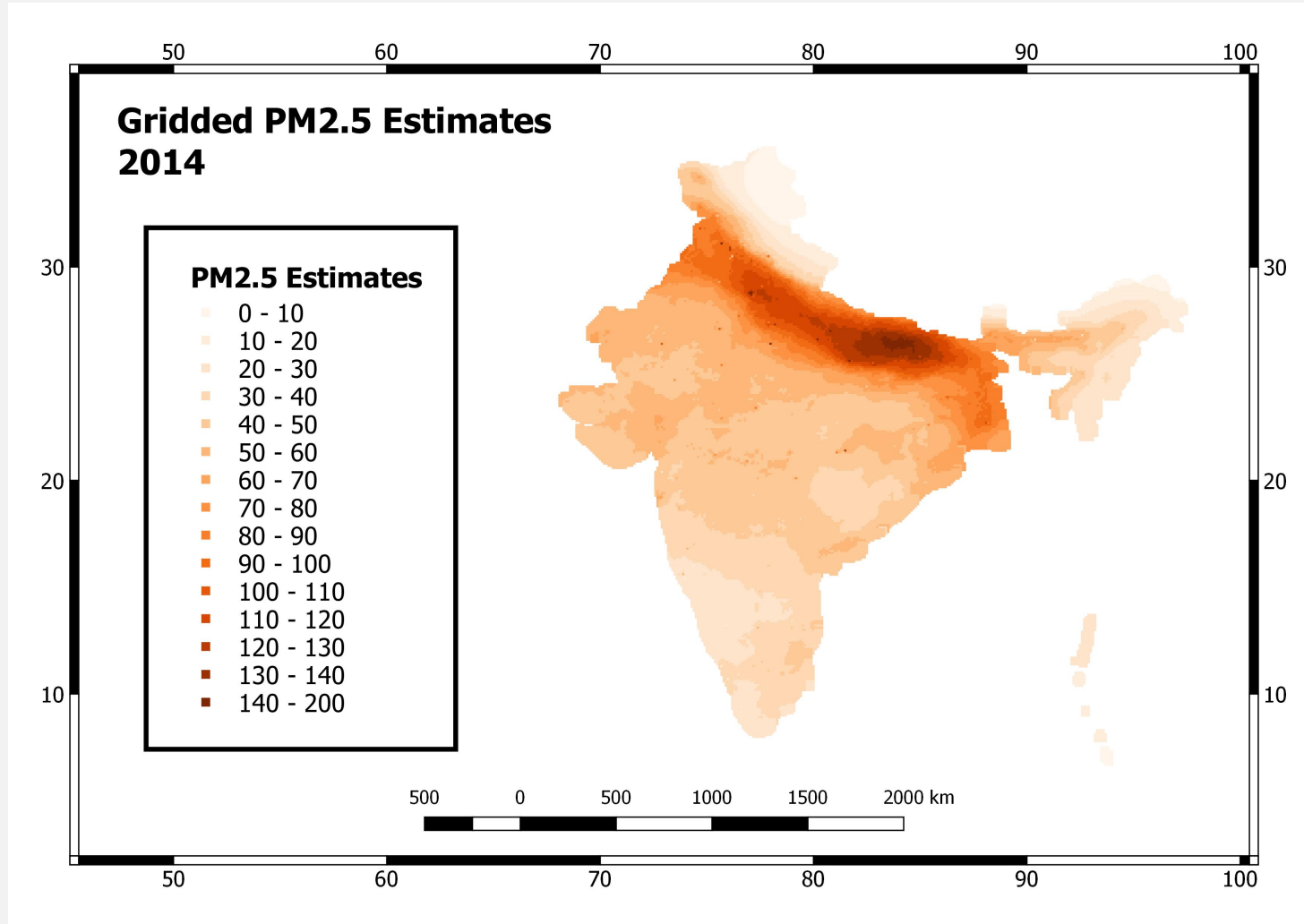


Por radio



A mano alzada

Crear un mapa



Datos de PM_{2.5} de la OMS en cuadrícula – Por país

- http://avdc.gsfc.nasa.gov/pub/tmp/WHO_PM25_2014_COUNTRY_DATA/



NASA GODDARD SPACE FLIGHT CENTER

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Aura
validation data center

OVERVIEW DATA TOOLS DOCUMENTATION LINKS EVENTS

OVERVIEW/ HOME

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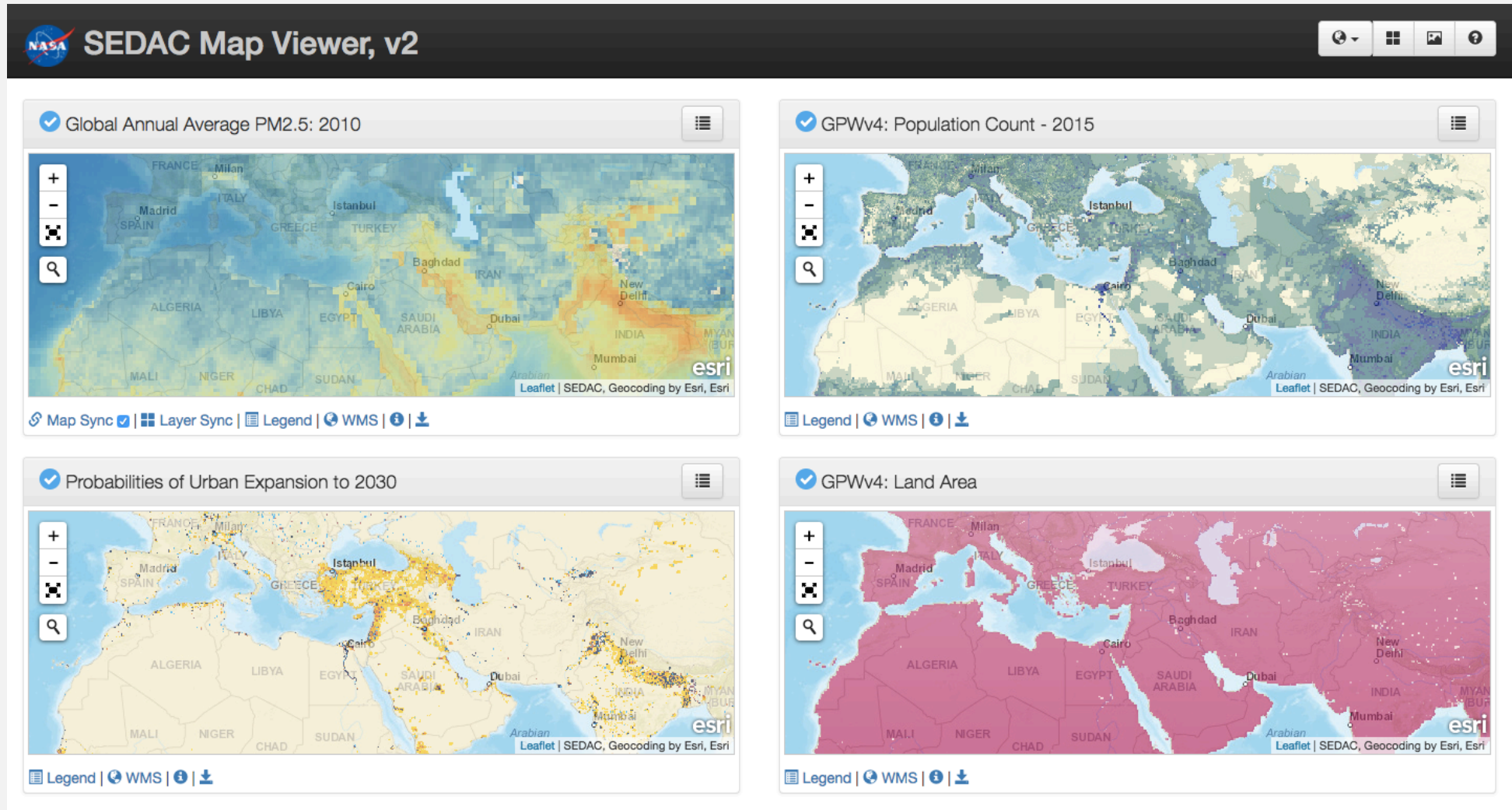
A world map with a semi-transparent white rectangular box overlaid on the center. The map uses a color scale from light yellow to dark red, with a white outline of country borders. The text box contains the text "Otros portales de datos y páginas en línea relevantes" in a black, sans-serif font. A horizontal black line is positioned below the text.

Otros portales de datos y páginas en línea
relevantes

Socioeconomic Data and Applications Center (SEDAC)*

*Centro de datos y aplicaciones socioeconómicos

<http://sedac.ciesin.columbia.edu/mapping/viewer/#>



Conjuntos de datos de PM_{2.5} obtenidos por satélites

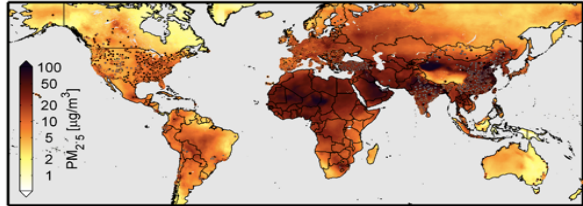
http://fizz.phys.dal.ca/~atmos/martin/?page_id=140

Atmospheric Composition Analysis Group

Research	Publications & Presentations	GEOS-Chem	Satellites	Datasets	SPARTAN	Group Info
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Surface PM2.5

Global Estimates:



We estimate ground-level fine particulate matter (PM2.5) by combining Aerosol Optical Depth (AOD) retrievals from the NASA MODIS, MISR, and SeaWiFS instruments with the GEOS-Chem chemical transport model, and subsequently calibrated to global ground-based observations of PM2.5 using Geographically Weighted Regression (GWR) as detailed in the below reference.

References:
van Donkelaar, A., R.V Martin, M.Brauer, N. C. Hsu, R. A. Kahn, R. C Levy, A. Lyapustin, A. M. Sayer, and D. M Winker, **Global Estimates of Fine Particulate Matter using a Combined Geophysical-Statistical Method with Information from Satellites, Models, and Monitors**, *Environ. Sci. Technol*, doi: 10.1021/acs.est.5b05833, 2016. [[Link](#)]

Scientific Datasets:
Global resolved datasets are provided in ArcGIS-compatible NetCDF [.nc] or zipped ASCII [.asc.zip] file. Note that the unzipped ASCII files can be cumbersome. Gridded files use the WGS84 projection. The 0.01° × 0.01° grid contains 12500 latitude coordinates, with centres from 54.995°S to 69.995°N, and 36000 longitude coordinates, with centres from 179.995°W to 179.995°E. The 0.1° × 0.1° grid contains 1250 latitude coordinates, with centres from 54.95°S to 69.95°N, and 3600 longitude coordinates, with centres from 179.95°W to 179.95°E. Corresponding files for Google Earth are also provided [.kmz]. Country means are also provided in a comma separated ascii (.csv) format. Dust and Sea-Salt Removed PM2.5 estimates apply simulated compositional information to our full-composition values, following van Donkelaar et al., EHP, 2015. Other extractions can often be produced upon request. Please contact Aaron van Donkelaar (Aaron.van.Donkelaar@dal.ca) for further information.

All Composition PM2.5:

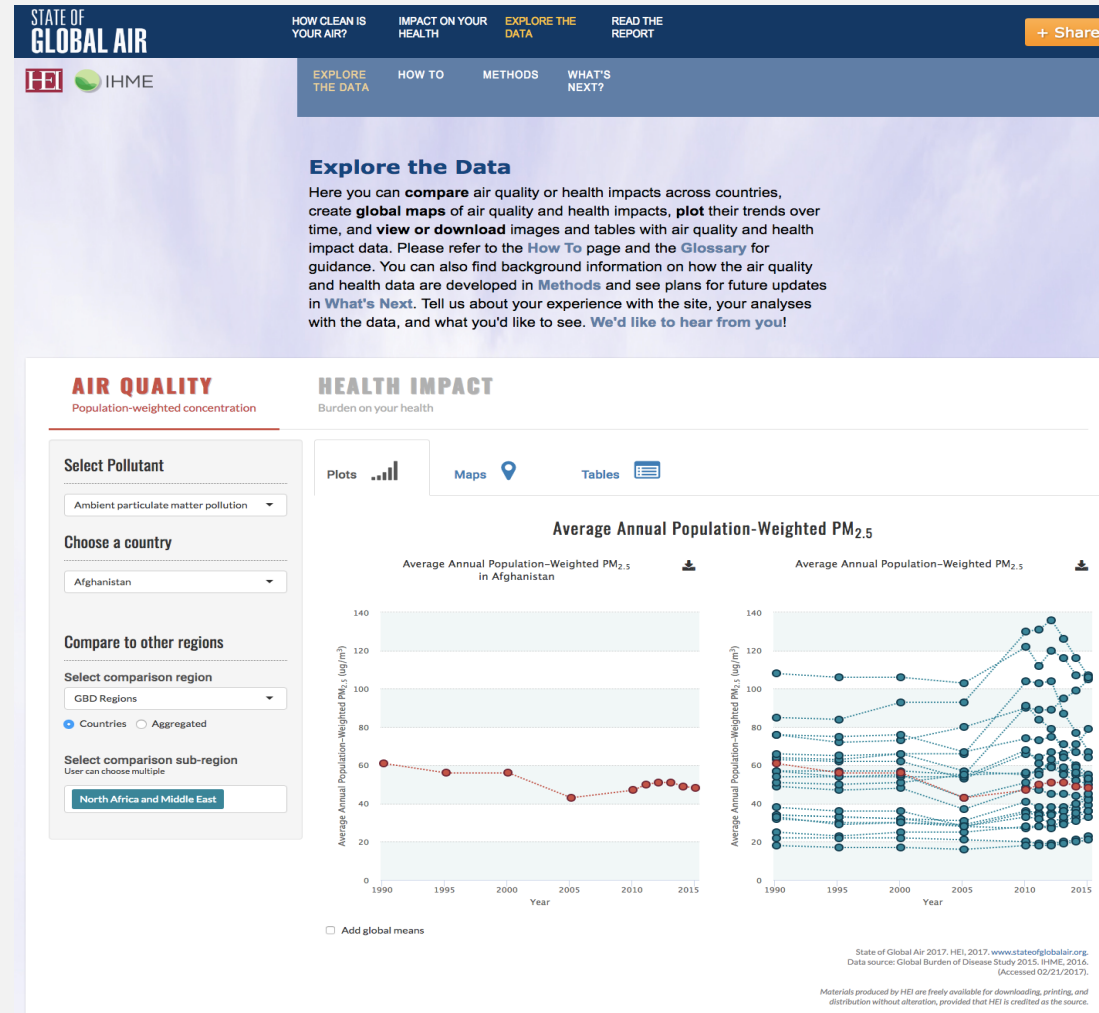
Satellite-Derived PM2.5, 2008, at 35% RH [ug/m3]
[0.1° × 0.1° \[.nc\] \[.asc.zip\] \[.kmz\] \[.csv\]](#)
[0.1° × 0.1° w GWR adjustment \[.nc\] \[.asc.zip\] \[.kmz\] \[.csv\]](#)
[0.01° × 0.01° w GWR adjustment \[.nc\] \[.asc.zip\] \[.kmz\] \[.csv\]](#)

Satellite-Derived PM2.5, 2009, at 35% RH [ug/m3]
[0.1° × 0.1° \[.nc\] \[.asc.zip\] \[.kmz\] \[.csv\]](#)

State of Global Air*

*Estado del aire mundial

<https://www.stateofglobalair.org/>



NASA- Air Quality (Calidad del aire)

<https://airquality.gsfc.nasa.gov/>



The screenshot shows the NASA Air Quality website. At the top, there is a navigation bar with the NASA logo, the text "Air Quality Observations from Space", and links for "AURA", "EOS Project", and "OZONE HOLE WATCH". A search bar is located on the right side of the navigation bar. Below the navigation bar, there is a main menu with links for "Home", "Data", "News", "Maps", "Publications", and "Resources". The main content area is titled "AIR QUALITY FROM SPACE" and contains a welcome message, a paragraph about the website's focus on nitrogen dioxide (NO₂) and ozone, and a link to "Data". Below this, there is a section titled "Before and After: World Nitrogen Dioxide Levels, 2005-2014" with two side-by-side world maps showing nitrogen dioxide levels. On the right side, there are two featured sections: "Air Quality Data on the Top 20 US Cities" and "Air Quality for 195 World Cities", each with a map and a description.



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Connecting NASA Data and Tools with Health and Air Quality Stakeholders

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