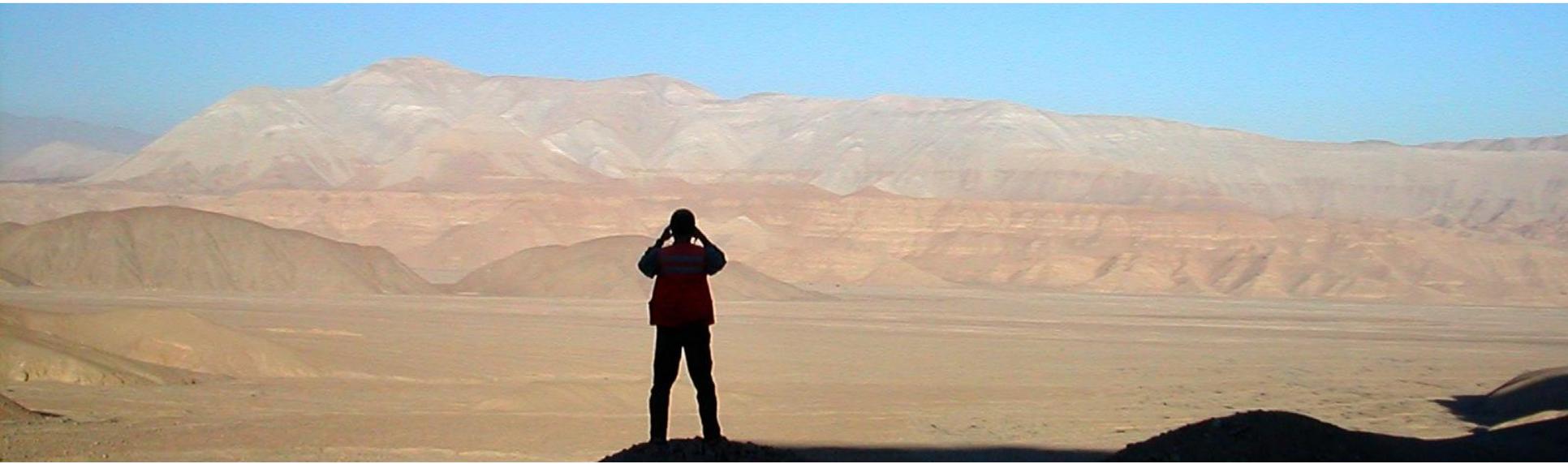


Servicios y Soluciones para Datos de Exploración Mineral

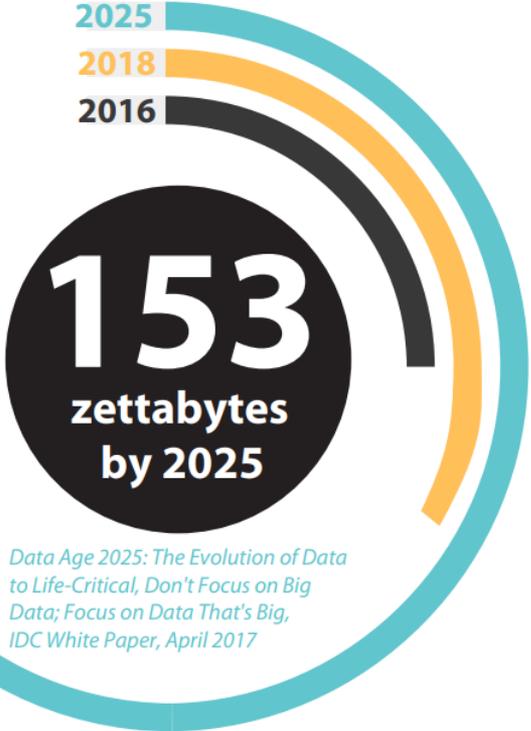


- **Consideraciones sobre datos**
 - Big Data
 - Machine Learning
 - Visión
 - Tipos de datos
 - Legado de Datos
- **Por qué organizar los datos**
- **Recuperando los datos de Legado**
 - Limpieza y Organización – HudBay
- **Distribución y Descubierta**
 - Tecnología de gestión de datos - QDEX DAP
- **Integración y Personalización**
 - Botswana Geoscience Portal
 - Geological Survey of Norway Geoscience Portal



Data Explosion

The digital universe is set to increase **10-fold** by 2025



Data Age 2025: The Evolution of Data to Life-Critical, Don't Focus on Big Data; Focus on Data That's Big, IDC White Paper, April 2017

<https://www.swisspostsolutions.com/en/infographic/businessprocessautomationinfographic.pdf>

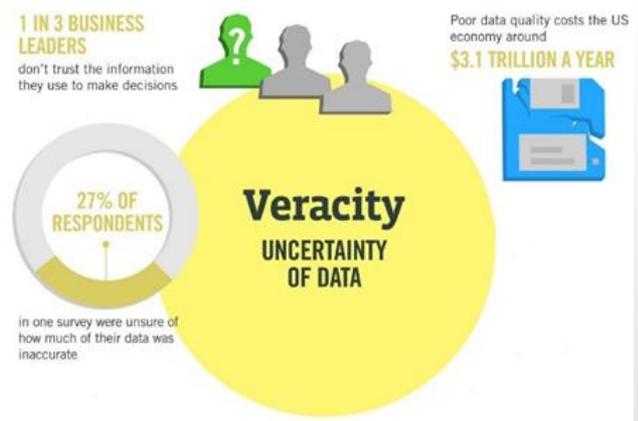
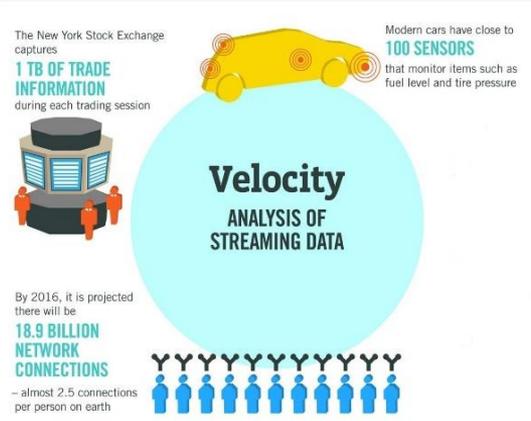
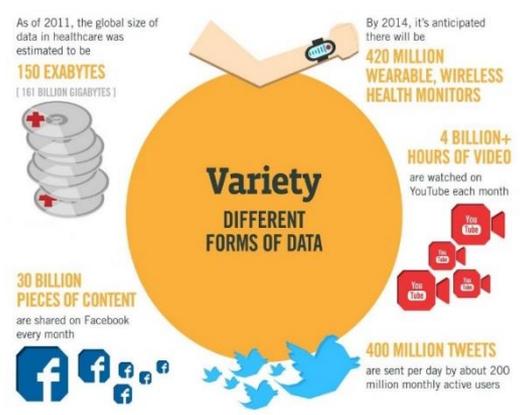
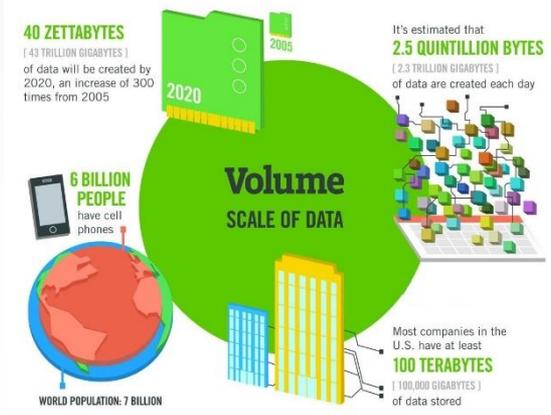
2018 This Is What Happens In An Internet Minute



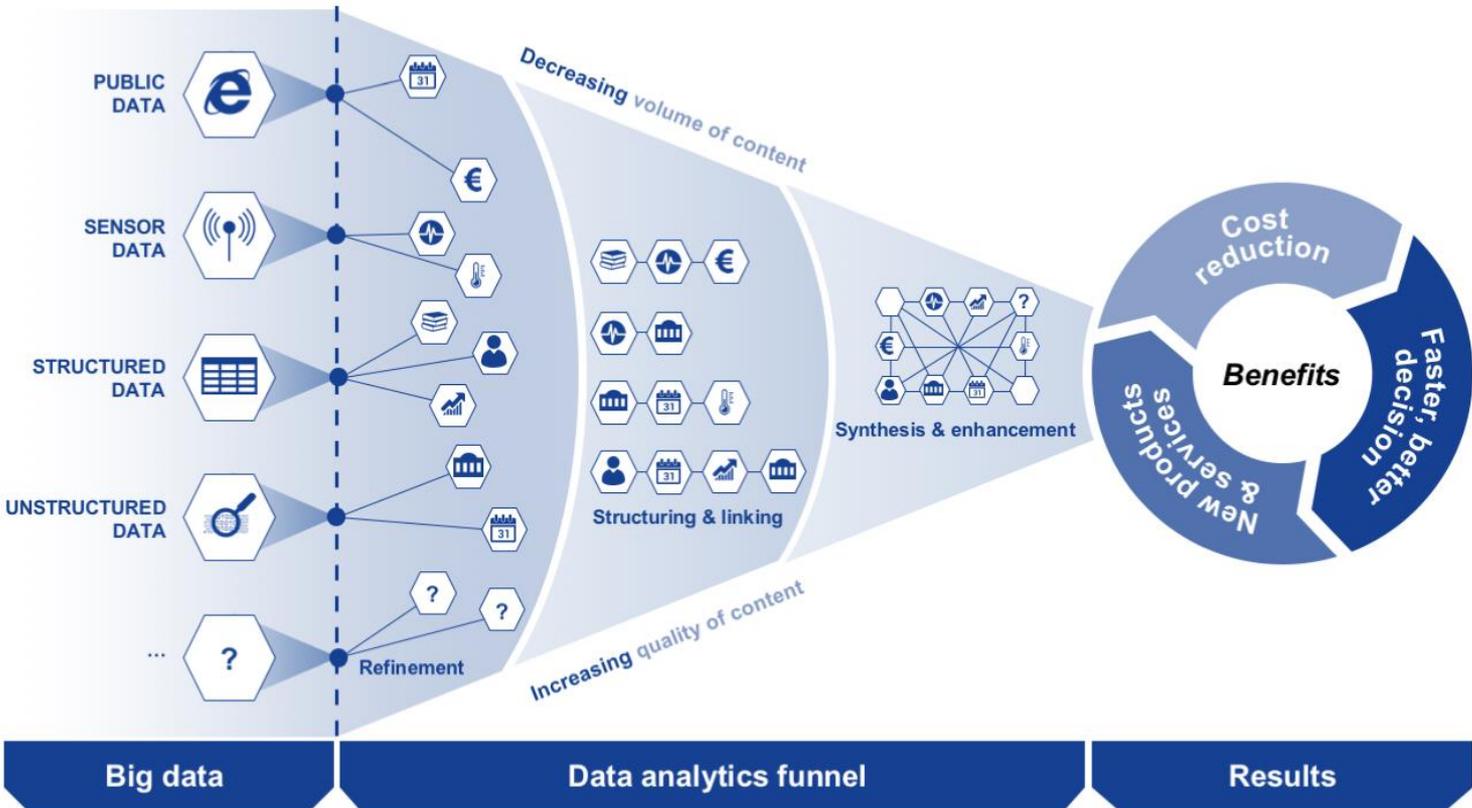
Created By:
@LoriLewis
@OfficiallyChadd

<https://jacobsmedia.com/wait-internet-minute/>

4 V's of Big Data



Extrayendo Valor de los Datos



Visión – ¿Como llegar allá?



Necesitamos cuidar de nuestros datos actuales, recuperar los datos legados y cuando disponible usar datos externos para extraer el máximo VALOR de los datos.



**Did
You
Know**

Every American
born will need:

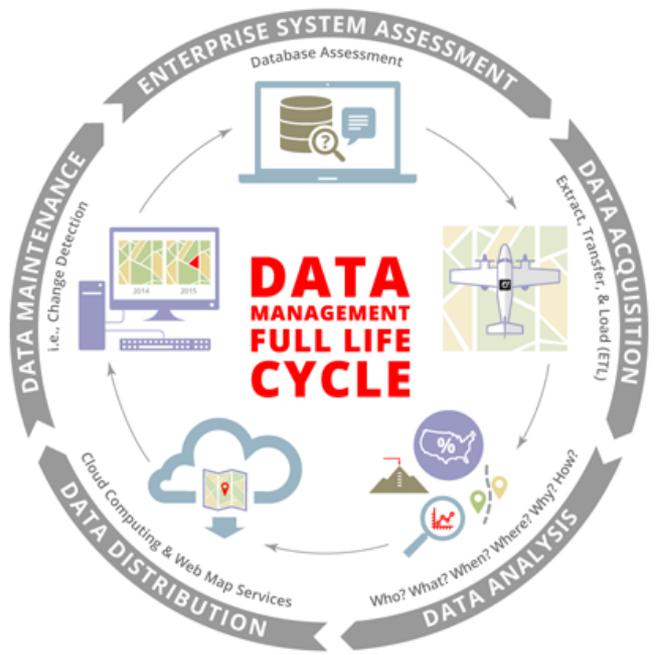


3.11 million pounds

of minerals, metals & fuel in a single lifetime

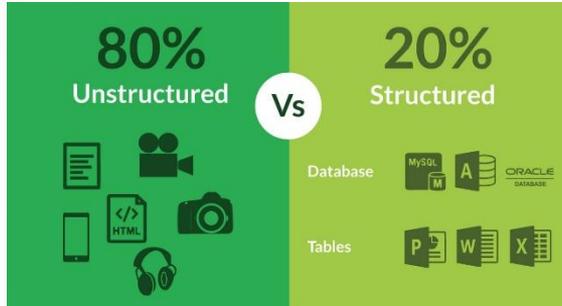
(1.410 Ton)

Exploración Mineral - Contexto

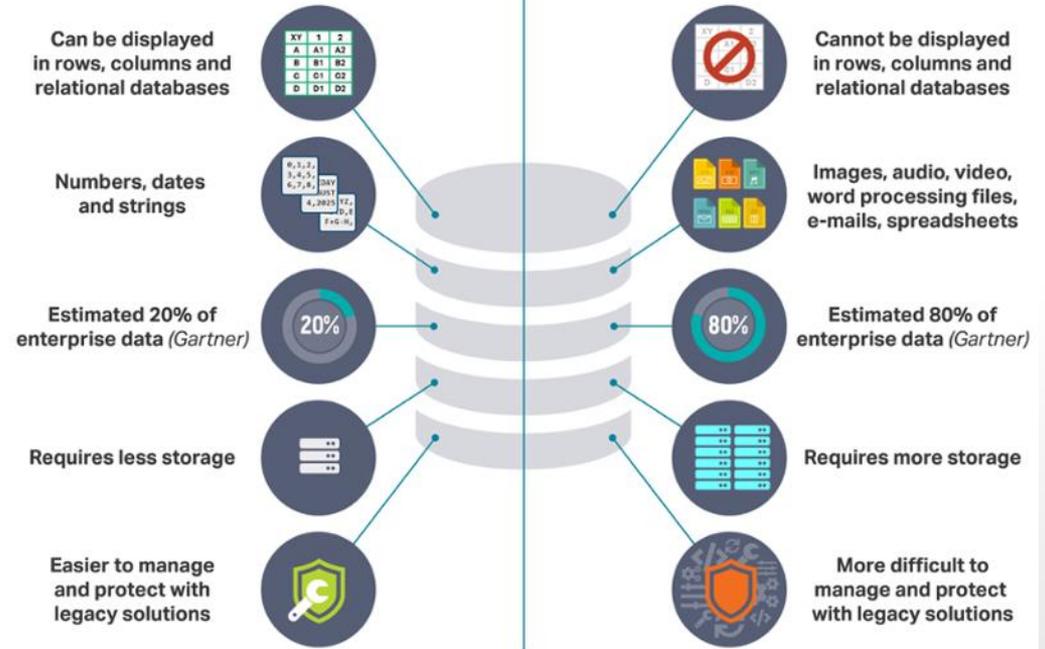


<https://www.sanborn.com/the-big-geospatial-data-management-lifecycle/>



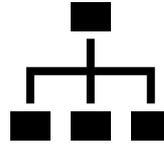


Structured Data vs Unstructured Data



- Una gran cantidad de datos históricos
- Falta un mapa claro de datos no estructurados y se encuentran datos estructurados.
- Medios limitados para manejar sistemáticamente estos datos
- Desafíos
 - Están en todas partes
 - Gran volumen
 - Requisitos continuos de almacenamiento
 - Encontrar la información valiosa

- Archivos compartidos
- Unidades de disco duro externo
- Email
- Servidores fuera de servicio
- Servidores 'secretos' o desconocidos



Esto es seguro ▾  Mi Departamento

▾  Cosas Nuevas

▾  Cosas Actuales

▾  Cosas Muy Actuales

Y esto ▾  Alta Prioridad

▾  Otro Departamento

▾  Archivos Súper Críticos

Esto es un bloqueo para mí ▾  Documentos Legales

▾  Nueva Carpeta

▾  Nueva Carpeta (2)

Esto está bloqueado para mis colegas ▾  Archivos de Administrador Anterior

▾  TEMP

▾  No TEMP

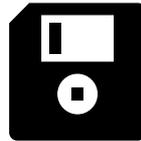
▾  Copias Antiguas

▾  No Borrar

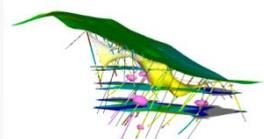
▾  Nueva Carpeta

 Seriamente

Incluso la mesa de servicio no puede desbloquear este

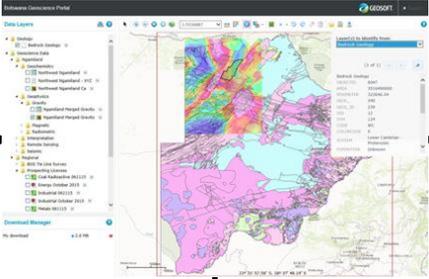


Como debería ser

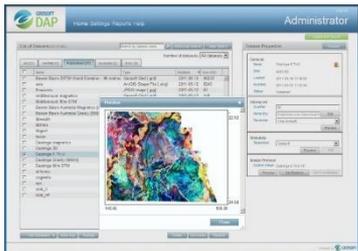


**Sondaje /
Geoquímico**

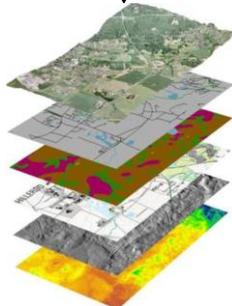
Integracion - Portal



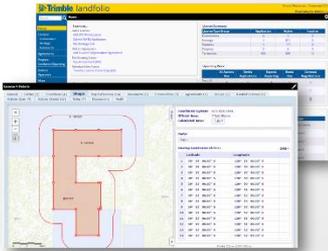
**Reportes /
Documentos**



**Geofísica / Imágenes
DAP**



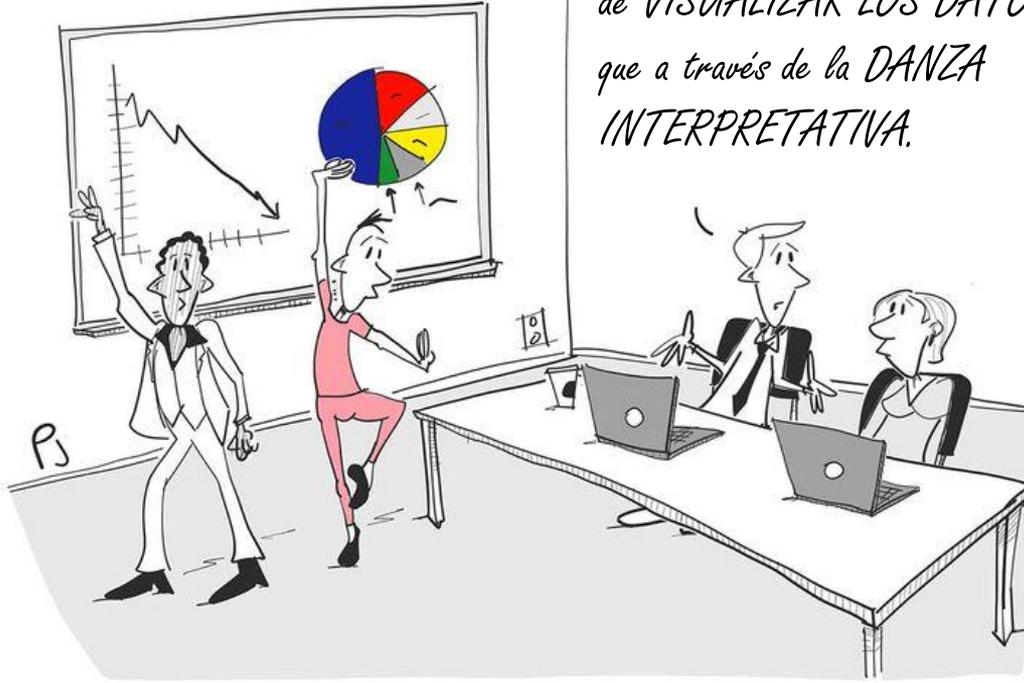
GIS & Geologia



**Derecho Minero
Landfolio**

Por qué organizar los datos

1417
151



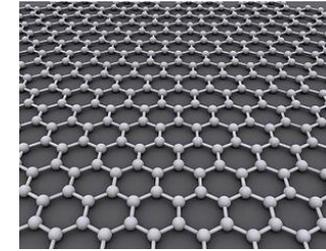
*Tiene que haber una mejor forma
de VISUALIZAR LOS DATOS
que a través de la DANZA
INTERPRETATIVA.*

Variación de valor de las commodities

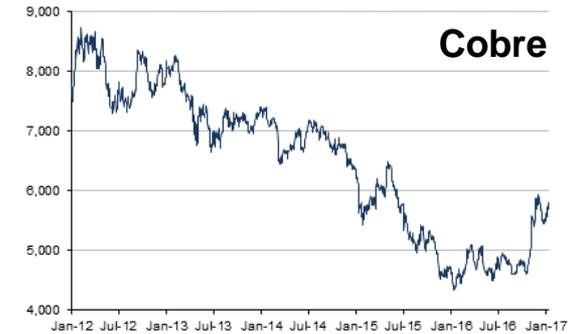
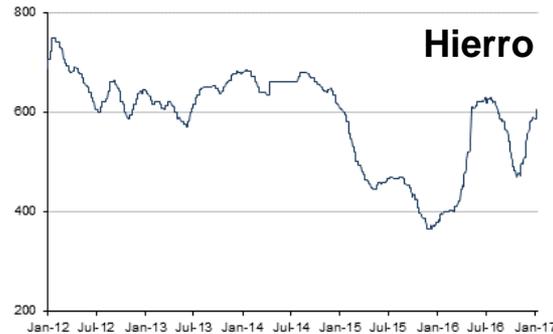
Política, nuevos minerales u otros



<https://minerals.usgs.gov/science/criticalglobal/index.html>



<https://es.wikipedia.org/wiki/Grafeno>



<https://www.focus-economics.com/commodities/base-metals>

Legado de Datos – Reutilización de datos



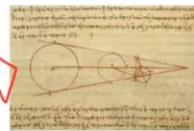
Early Greeks

Aristarchus of Samos
(3rd C B.C.)



First to describe a heliocentric universe

Calculated size of Earth and distances to Moon/Sun



The Renaissance

Nicolaus Copernicus
(1473-1543)



1532 → 'On the Revolutions of Heavenly spheres'

Watershed moment for scientific revolution

Definitively placed Sun at centre of Solar system

17th - 20th C

Argued for finite universe

Argued for galaxies



Kepler

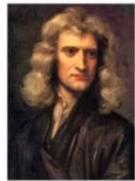


Kant



Digges

Ober's paradox
↓
infinite universe
↓
bright nights

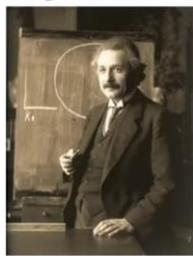


Newton's 3 Laws



20th C cosmology

Albert Einstein
1915



General theory of relativity

Space-time

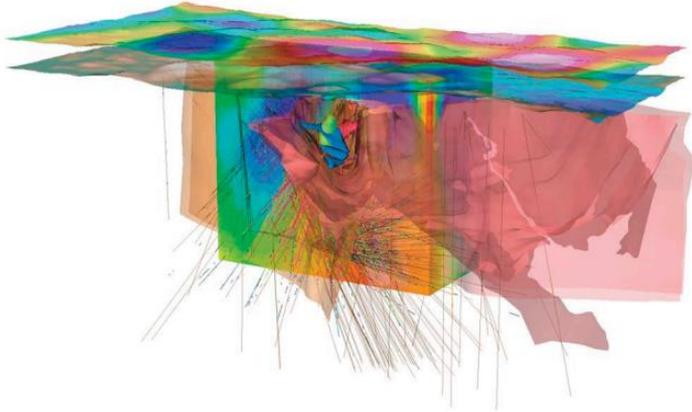
Black Holes

'Gravity' waves
'Gravitational Lensing'

Time dialation

VOXI Earth Modelling

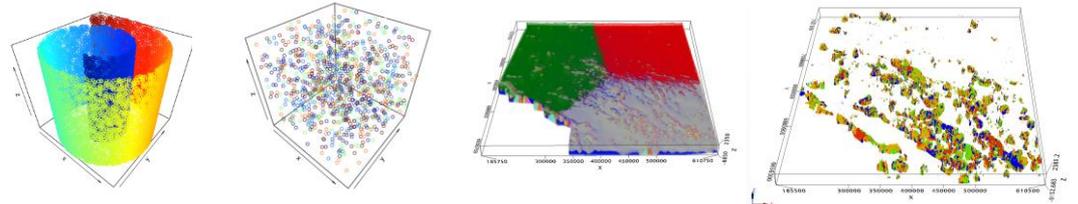
Build integrated exploration models with geology and geophysics



Self-Organizing Maps (SOM)

SOM es una técnica de clasificación no supervisada usada para analizar y visualizar datos de alta dimensión basado en los principios de las mediciones del vector de cuantización.

Es una herramienta ideal para analizar un conjunto de datos con parámetros geofísicos dispares, cuando uno está buscando por relacionamientos y tendencias.



Recuperando los datos de Legado





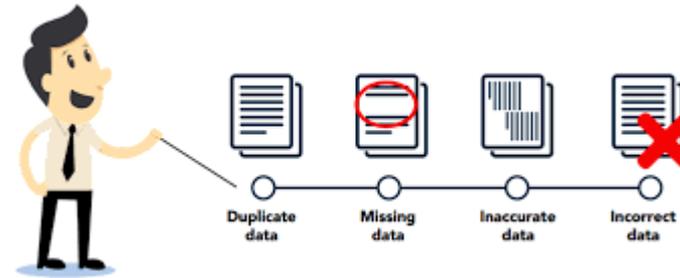
1- Consolidar

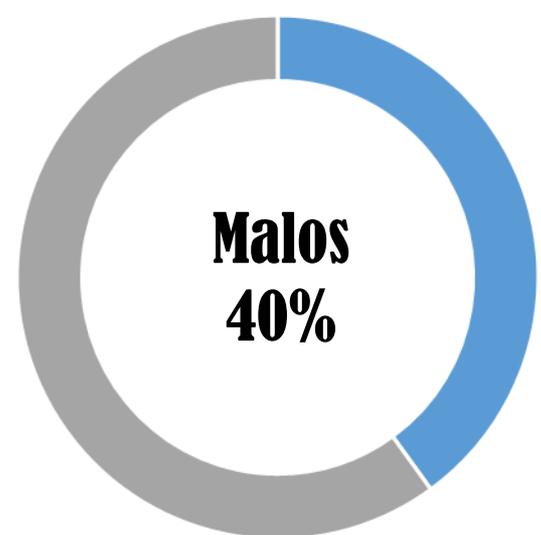
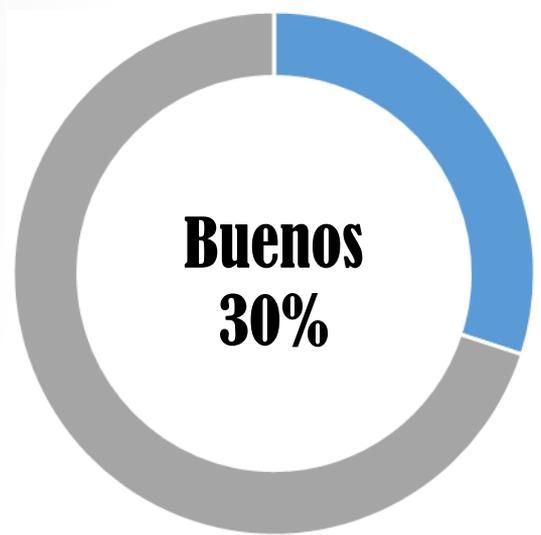
2- Analizar

3- Obtener Resultado

Hasta 80% de los datos de Geociencias son redundantes, obsoletos o triviales (ROT).

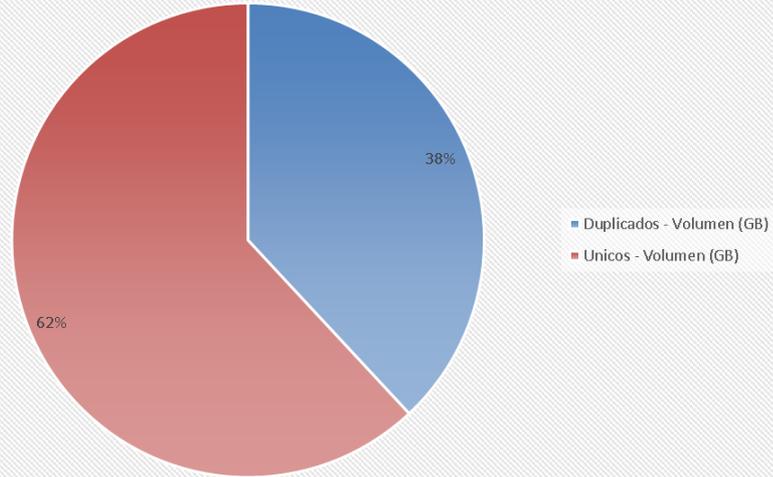
Faults.tab
faults.tab
Faults_Final.tab
Faults_final_v2.tab



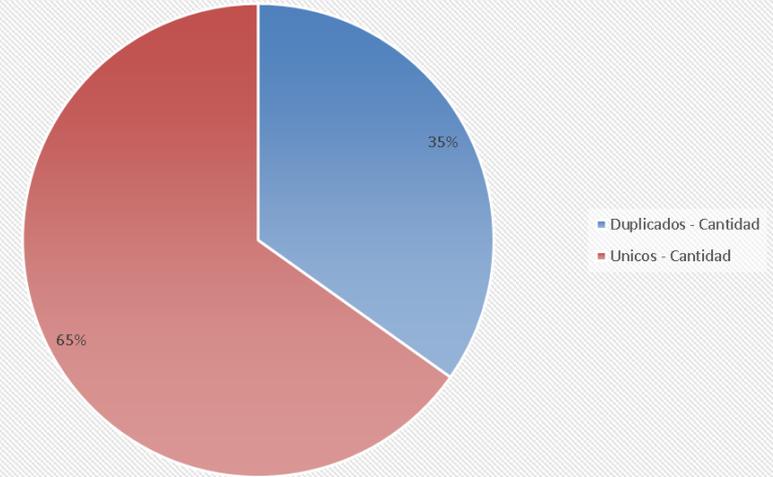


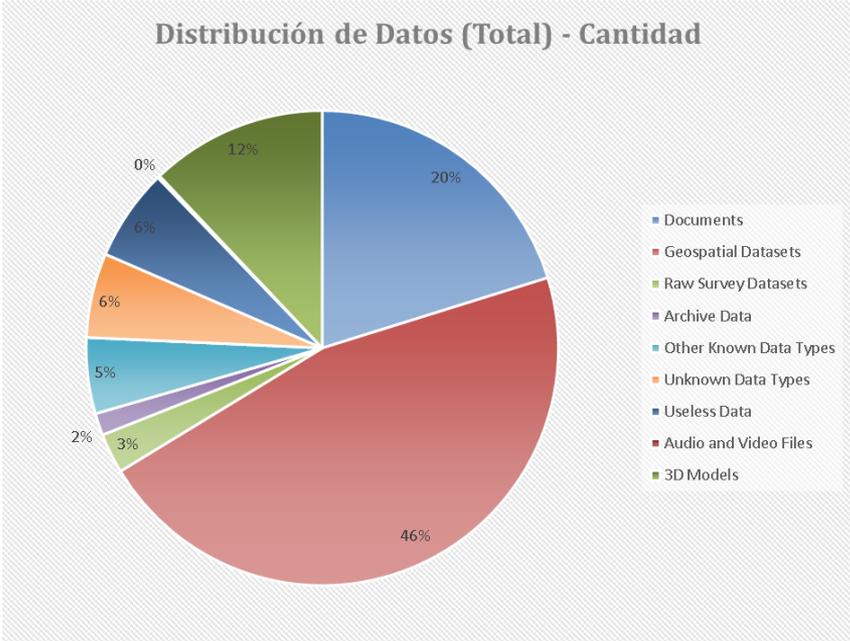
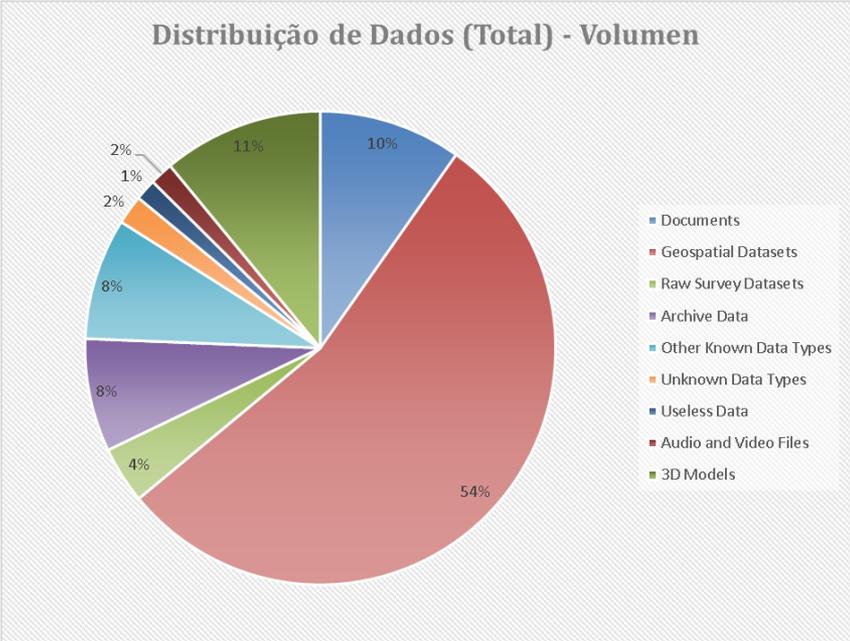
Promedio de nuestros clientes

Duplicados - Volumen



Duplicados - Cantidad

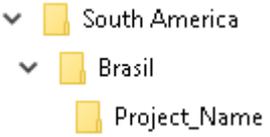




Recomendaciones



✓ Estructura de carpetas



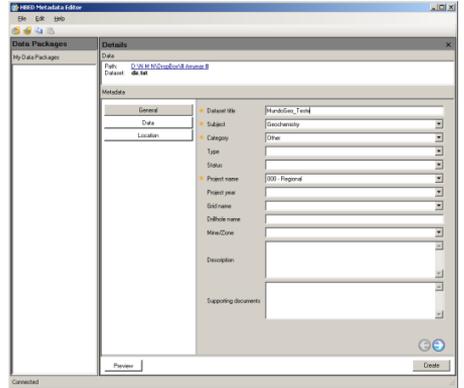
✓ Nomenclatura de datasets

SAM_Brazil_ProjectName_MAG.zip

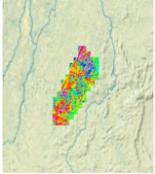
✓ Datos Crudos

✓ Metadados

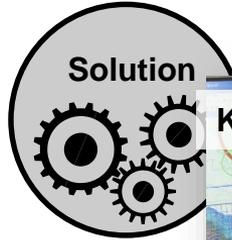
✓ Gestión de Informaciones Georreferenciadas



Geosoft	
Title: MAG_200-00_TMR	
Description:	
Metadata:	
Data / General / Coordinate System	
- Data	
Data format: Geosoft Database	
Scale (1): Not Applicable	
- General	
Data type (level 1): Geophysics - Surface	
Data type (level 2): Magnetics	
Data type (level 3): TMR	
Reference Document: http://tools.bvcharge.com/exploracion/Geosoft/Geophysica%20Documents/1270-0276-Geophysica_Surface_V4.0/Mag_200-00.pdf	
- Coordinate System	
Type: TRANSVERSE_MERCATOR	
Name: NAD83 / UTM zone 18N	
Units: m	
Local datum: [NAD83] (46) North America - Canada and USA (CONUS, Alaska mainland)	
Extent:	
Min X: 71745.0040033	
Max X: 805109.0000000	
Min Y: 344876.6040000	
Max Y: 809302.0073338	



Limpieza y Organización



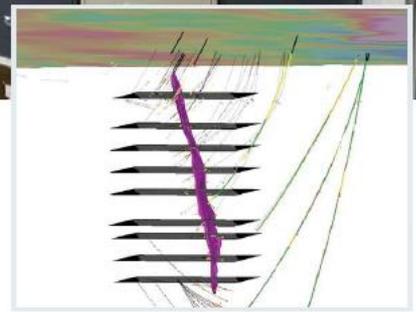


Historical data finds new life on central server: Hudbay aims to find new mine in Flin Flon camp using data already collected

by Virginia Heffernan

I see the integration between the three disciplines (geology, geochemistry and geophysics) becoming more commonplace. As deposits become tougher to find, that kind of collaboration will be the key to discovering our next mine.

-Peter Dueck, Chief Geophysicist, Hudbay



Having data in a central system has led to improved workflows, team collaboration and better 3D interpretations incorporating geophysics, geology and geochemistry. Shown above: A 3D model generated with data from Hudbay's DAP server.

Limpieza y Organización - Hudbay



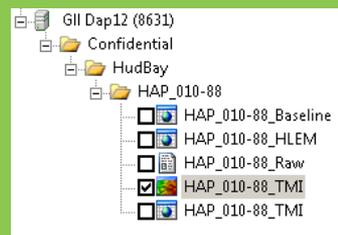
Revisión de datos

- CALCOMP.PLS
- HAP10.CAL
- HAP10.CON
- HAP10.EM
- HAP10.LIN
- HAP10
- HAP10.PLT
- HAP10.XYZ
- HAP10C.DEV
- HAP10C.PLT
- HAP10EM.EMR
- HAP10GD.DEV
- HAP10GD.PLT
- HAP10MD.GRD
- HAP10M2.GRD
- HAP10MP.DEV
- HAP10MP.PLT
- HBTITLE.CON
- MAPLINE.CON
- STAKPOST.CON
- STAKPROF.CON

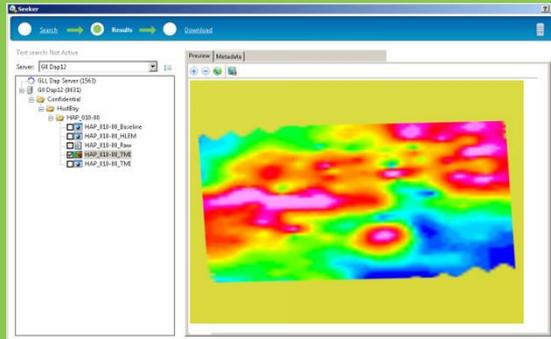
Preparación de datos

- HAP_010-88_Baseline.gdb
- HAP_010-88_Baseline.gdb.xml
- HAP_010-88_HLEM.gdb
- HAP_010-88_HLEM.gdb.xml
- HAP_010-88_Raw.zip
- HAP_010-88_Raw.zip.xml
- HAP_010-88_TMI.gdb
- HAP_010-88_TMI.gdb.xml
- HAP_010-88_TMI.grd
- HAP_010-88_TMI.grd.gi
- HAP_010-88_TMI.grd.xml

Listo!



Title: HAP_010-88_TMI	
Metadata:	
Description	Data
Coordinate System	Metadata File
- Description	
Primary Theme/Subject: Geophysics - Surface	
Secondary Theme/Category: Magnetics	
Tertiary Theme/Type: TMI	
File Format: Default Gdb	
- Data	
Data Source: Hudbay	
Confidentiality: Confidential	
Created By: Lewis, Sule	
Creation Date: 2014-03-03	
- Coordinate System	
Type: TRANSVERSE_MERCATOR	
Name: NAD83 / UTM zone 14N	
Units: m	
Local Datum: [NAD83] (4m) North America - Canada and USA (CONUS, Alaska mainland)	
Extents	
Min X: 317530 60745614	
Min Y: 4053107 79478058	
Max X: 318478 09160996	
Max Y: 4053026 01481017	



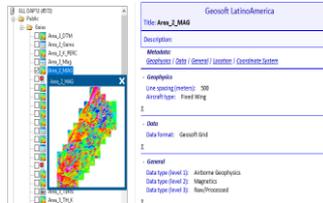


- Informaciones sobre el dato
- Usados para búsqueda
- Estándar ISO 19139, FGDC etc
- Combinación de XML y SQL
- Herramienta de Edición de Metadatos

Geosoft	
Title: HAP_010-88_TMI	
Description:	
Metadata: Data General Coordinate System	
- Data	
Data format: Geosoft Database	
Scale (1:): Not Applicable	
↑	
- General	
Data type (level 1): Geophysics - Surface	
Data type (level 2): Magnetics	
Data type (level 3): TMI	
Reference Document: http://hudbayxchange/exploration/Geospatial/Geophysical%20Datasets/A-1270-027B-Geophysics_Surface-HLEM-HAP_010-88.pdf	
↑	
- Coordinate System	
Type: TRANSVERSE_MERCATOR	
Name: NAD83 / UTM zone 14N	
Units: m	
Local datum: [NAD83] (4m) North America - Canada and USA (CONUS, Alaska mainland)	
Extents	
Min X:	317543.30840013
Min Y:	6053109.05030002
Max X:	318476.828045956
Max Y:	6053921.36715368
↑	



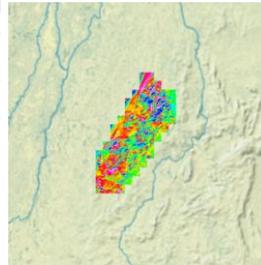
Selecciona tu área de proyecto.



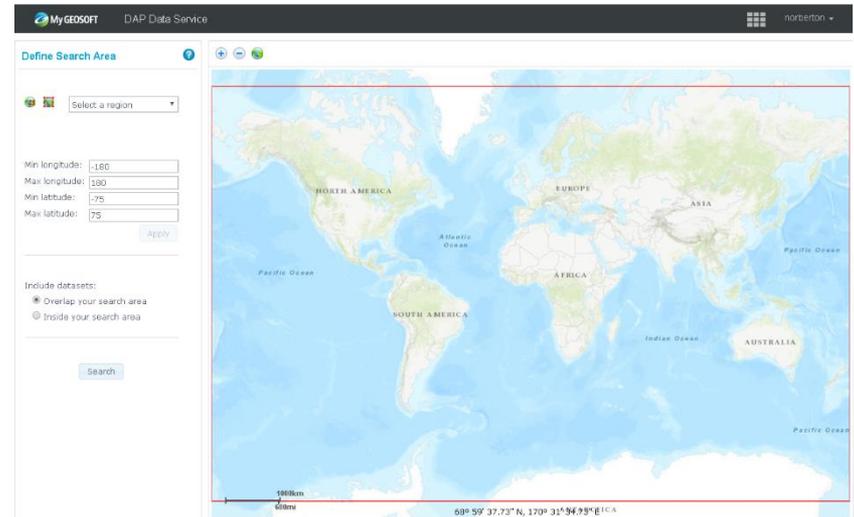
The screenshot shows the Geosoft software interface. On the left is a tree view of datasets. On the right is a metadata panel for 'GeoSoft Latinoamerica' with the following details:

- Title: Area_UMM
- Description:
- Keywords: Geosoft / Data / General / Location / Geosofts Dataset
- Geophysics: Line spacing (meters): 300, Anisotropy: Fixed string
- Data: Data format: Geosoft Grid
- General: Data type (level 1): Antenna Geophysics, Data type (level 2): Magnetica, Data type (level 3): Raw/Processed

Analizar y seleccionar los datos.



Visualización en el mapa y descargar.



The screenshot shows the 'Define Search Area' web interface. It includes a 'Select a region' dropdown menu, input fields for bounding box coordinates, and a search button. The bounding box values are:

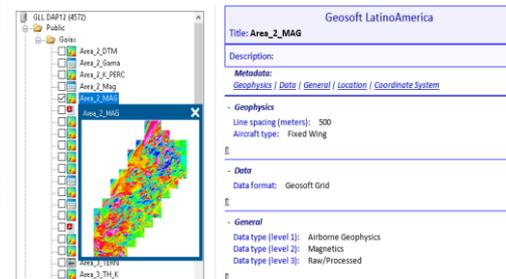
- Min longitude: -180
- Max longitude: 180
- Min latitude: -75
- Max latitude: 75

Under 'Include datasets:', the 'Overlap your search area' radio button is selected. The interface also features a world map with a red search area box and a scale bar (0-1000km).

- 📄 Índexar.
- 🔍 Buscar.
- 👁 Pre-visualisar.
- ⬇ Descargar.
- 🔒 Seguridad.
- 🔄 Calidad y confiabilidad.

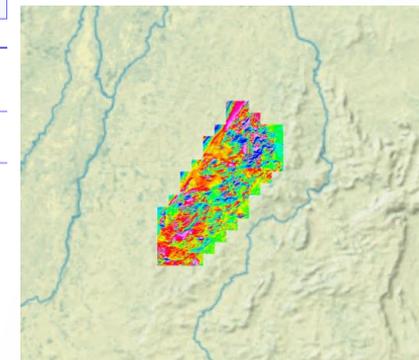


Selecciona tu área de proyecto.

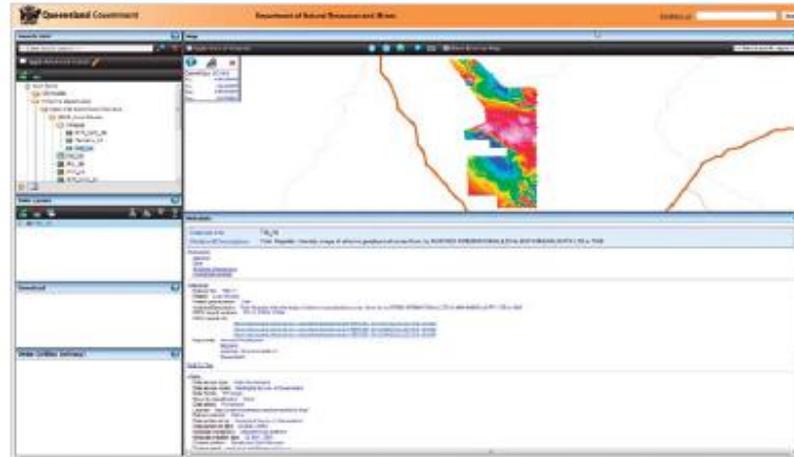


The screenshot shows the DAP software interface. On the left is a tree view of data layers, including 'Area_2_DTM', 'Area_2_Dema', 'Area_2_X_PIRC', 'Area_2_Map', 'Area_2_MAG', and 'Area_2_MAG'. The 'Area_2_MAG' layer is selected. On the right is a metadata panel for 'Geosoft LatinoAmerica' with the title 'Area_2_MAG'. The metadata includes a description, location, and coordinate system. Below the metadata are sections for 'Geophysics' (Line spacing: 500, Aircraft type: Fixed Wing), 'Data' (Data format: Geosoft Grid), and 'General' (Data type (level 1): Airborne Geophysics, Data type (level 2): Magnetic, Data type (level 3): Raw/Processed).

Analizar y seleccionar los datos.



Visualización en el mapa y descargar.



The Geological Survey of Queensland's new online system QDEX Data contains both government and private company survey results, such as the Avon Downs airborne geophysics survey, available as both Images and data.

QDEX Data: The new face of Queensland surveys

Search Queensland - Geoscience Data

--- Enter text to search ---

Apply Advanced Search

- Queensland - Geoscience Data (13241)
 - 3D Models
 - Airborne Geophysics
 - Open File Exploration Surveys
 - Open Range and Multi-Client
 - State and Federal Surveys
 - Qld_Radiometric_Ternary_Image
 - Queensland Merged Analytical Signal
 - Queensland Merged 1VD
 - Queensland Merged RTP
 - Queensland Merged TMI
 - Rad_Dose
 - Rad_Pot_pct
 - Rad_Tho_ppm
 - Rad_Ura_ppm
 - ASTER
 - Data Packages
 - Geochemistry
 - Ground Geophysics

Map

Apply Area of Interest

Coord-Sys GDA94
Xmin 107.503573
Ymin -30.070904
Xmax 104.044017
Ymax -8.240966

Data Layers

- Queensland Merged TMI

Download

- Queensland Merged TMI Preparing data...8%

Order (Offline Delivery)

Metadata

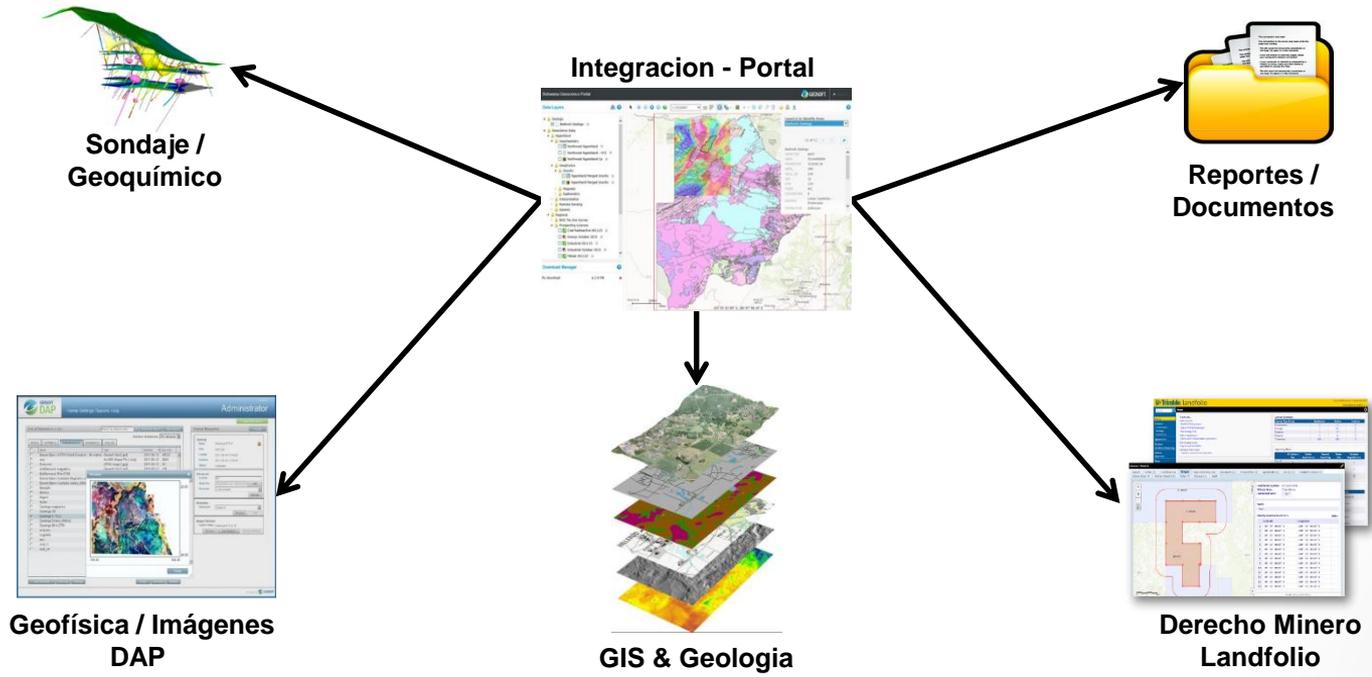
Dataset title Queensland Merged TMI

Abstract/Description Merged total magnetic intensity grid of regional magnetic survey data across Queensland. Merged data includes that collected by State and Federal governments as well as open range and multi-client surveys. Data has been levelled between surveys using data from the Australia Wide Airborne Geophysical Survey (AWAGS). However, line spacing, direction and flight height varies between surveys resulting in non-exact levelling. The data for each individual survey can be found on QDEX Data and is superior to this merge.

Metadata:
[General](#)
[Data](#)
[Airborne Geophysics](#)
[Coordinate System](#)

- General
Dataset title: Queensland Merged TMI
Project: Queensland Merge
Project year/uration: 2012
Abstract/Description:
Merged total magnetic intensity grid of regional magnetic survey data across Queensland. Merged data includes that collected by State and Federal governments as well as open range and multi-client surveys. Data has been levelled between surveys using data from the Australia Wide Airborne Geophysical Survey (AWAGS). However, line spacing, direction and flight height varies between surveys resulting in non-exact levelling. The data for each individual survey can be found on QDEX Data and is superior to this merge.
Supporting documents: <http://www.qg.gov.au/about/what-we-do/projects/minerals/conclude/awags>
Keywords: Airborne Geophysics
Miscellaneous

Integración y Personalización



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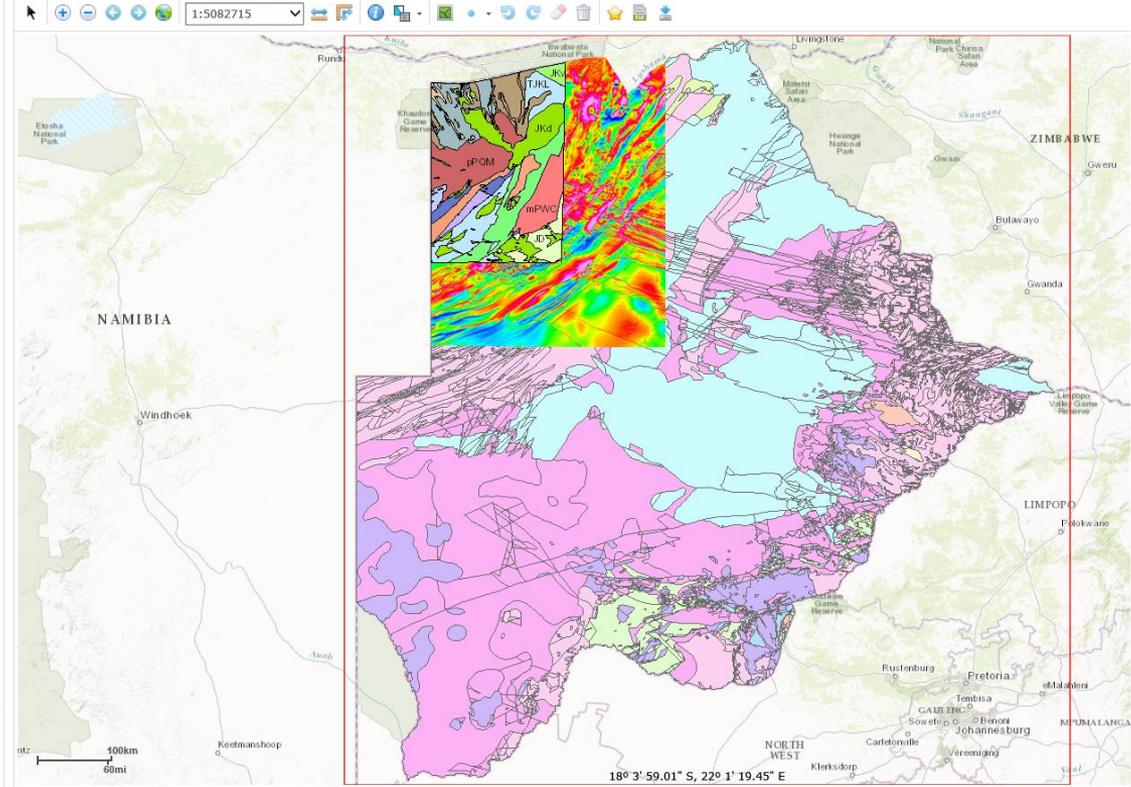


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Data Layers

- Geology
 - Bedrock Geology
 - IGS Xplore Ngamiland Geology
- Geoscience Data
 - Ngamiland
 - Geochemistry
 - Geophysics
 - Gravity
 - Magnetic
 - Aeromagnetic survey of western N
 - Block A
 - Block A
 - Boteti
 - Boteti TMI
 - Deception Pan
 - Deception Pan Igrf
 - Ghanzi
 - Ghanzi Chobe
 - Mopipi
 - Mopipi
 - Ngamiland Merge TMI
 - Okavango Logistics Report
 - Okavango TMI
 - Radiometric
 - IGS Xplore Prospectivity Maps
 - Interpretation
 - Remote Sensing
 - Seismic
 - VOXI Inversion Results
- Regional

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1:2297347

Data Layers

- Geological and Exploration Permit Data
 - Norway
 - DMF Exploration and extraction permit
- Geophysical Data
 - NGU DAP
 - Geophysics - Airborne
 - Geophysics - Compilation
 - Magnetics
 - Knit_HAT_Nipa_mag_HG
 - Knit_HAT_Nipa_mag_TI
 - Knit_HAT_Nipa_mag_VG
 - Knit_HAT_Nipa_midlev_mag
 - M_Karasjok_surveys_242_251_2
 - M_Karasjok_surveys_242_251_2
 - Mag_Finmark_Troms_1979-2015
 - Mag_Jotunheimen - 1979-2015
 - Mag_Oslo_Telemark_1981-2016
 - MAG_Sokndal_Sirdal_Kvinesdal -
 - MAG_Trendelag - 1986-2014
 - MAG_Trendelag-Hedmark - 1979-:
 - magNor - XYZ file
 - NordTrondelag_2010
 - NordTrondelag_2010 - XYZ file
 - Stitch_Final_Mag_midlev_5x5
 - Stitch_Final_Mag_midlev_HG_5x5
 - Stitch_Final_Mag_midlev_TI_5x5
 - Stitch_Final_Mag_midlev_VG_5x5
 - Survey_Finmark_1979_1991
 - Survey_Finmark_1979_1991 - X
 - Survey_Finmark_1979_1991_U
 - Survey_Finmark_1979_1991_U
 - Survey_Finmark_1979_1991_U
 - Survey_Finmark_1979_1991_U

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69°34' 57.88" N, 13° 11' 13.18" E

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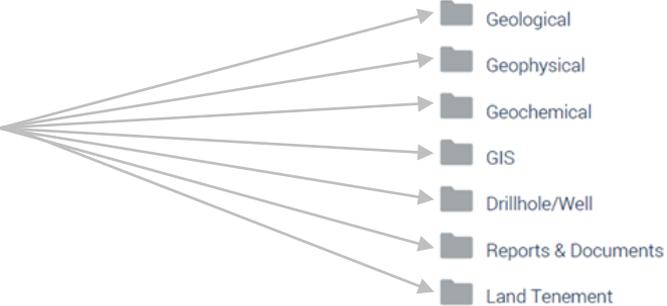


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Integration Services



Gracias!

¿Preguntas?

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Promoción Inventario

<http://www.geosoft.com/get-started/data-scan>

Servicios de datos

<http://www.geosoft.com/services/data-services>

Hudbay – Ejemplo de Servicios de datos

http://www.earthexplorer.com/2014/Historical_data_finds_new_life_on_central_server.asp

DAP Server - Geospatial Server for Exploration Data and Metadata Repositories

<http://www.geosoft.com/products/dap-server/overview>

Queensland – Ejemplo de DAP

<http://qdexdata.dnrm.qld.gov.au/flamingo>

Geoscience Portal - Integrated data delivery

<http://www.geosoft.com/professional-services/systems-integration>

Public Geoscience Portal

- Botswana: <http://geoscienceportal.geosoft.com/Botswana/search>
- Norway: <http://geo.ngu.no/GeosciencePortal/search>

VOXI Earth Modelling

<http://www.geosoft.com/products/voxi-earth-modelling/>