

IGMAS+: a success story of a 3-D potential field modelling software (EGU22-9388)



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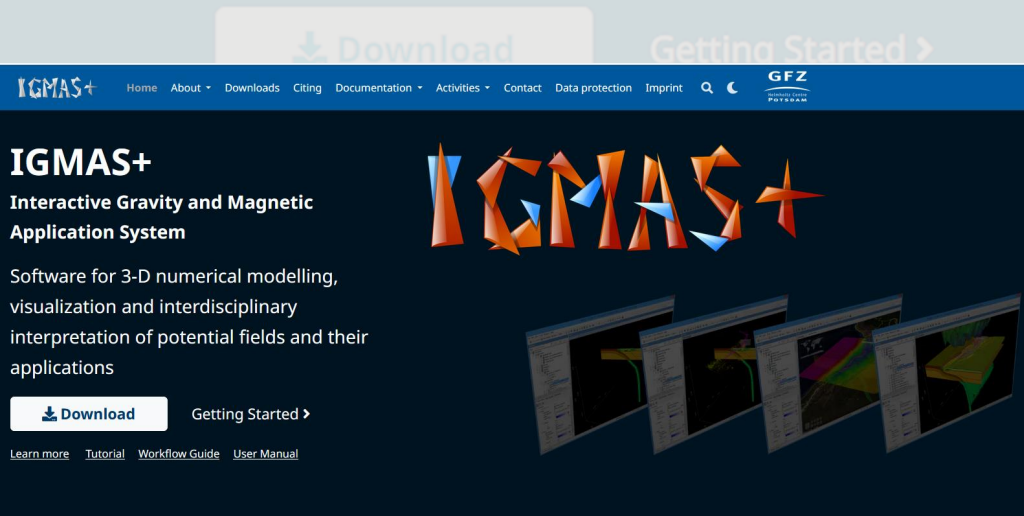
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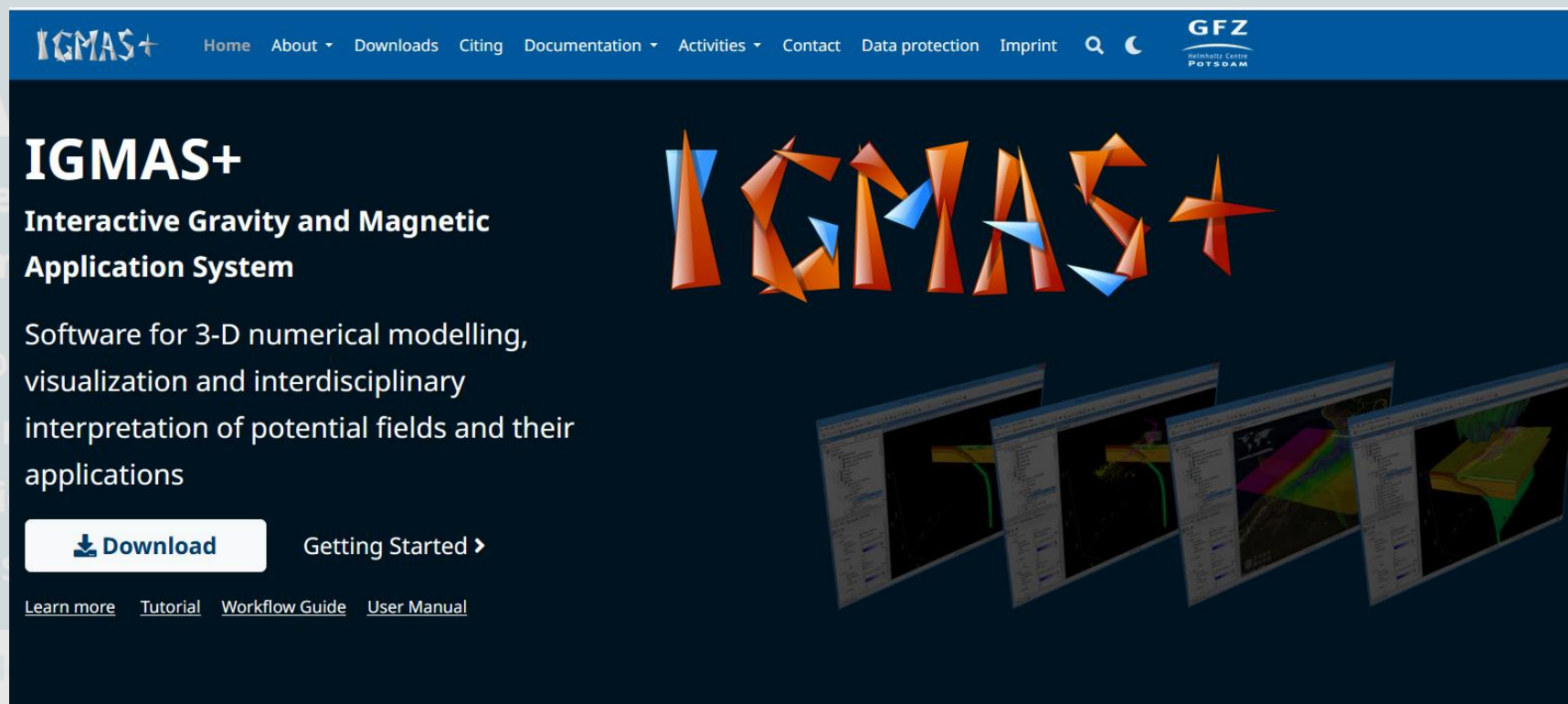


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DISPLAY MATERIAL



<https://igmas.git-pages.gfz-potsdam.de/igmas-pages/>



<https://igmas.git-pages.gfz-potsdam.de/igmas-pages/>

3-D gravity and magnetic modelling appreciably improves the results of distinct depth imaging projects. This regards especially to areas of strong lateral seismic velocity and density contrasts and corresponding imaging problems. Typical areas where grav/mag modelling has been successfully used are sub-salt and sub-basalt settings.

What makes **IGMAS+** highly efficient and user-friendly is that it allows adjusting the geometries and physical properties of modelled subsurface bodies interactively, i.e. while the corresponding calculated and measured potential field components are visualized together with independent observations.

Features



Availability

No-cost license upon request



Performance

Hardware-accelerated parallel calculations



Interactivity

User-friendly graphical interface



Cross-platform

Implementation in Java



Wide User Community

Hundreds of users world-wide



Long History

Over 40 years of development



Time Machine

Timeline-based project management



Global Visualization

NASA WorldWind Plugin



Customization

Big variety of themes

Events: talks, workshops, meetings

2021

vEGU21: Interdisciplinary data-constrained 3-D potential field modelling with IGMAS+

Introducing a modelling concept for the construction of 3-D data-constrained subsurface structural density models

Apr 30, 2021 16:10 — 17:00 · vEGU21: Gather Online
Dr. Denis Anikiev

PDF DOI

DGG 2021: Interdisciplinary 3D potential field modelling of complex lithospheric structures by IGMAS+

Introducing an approach for 3D joint interpretation of potential fields and its derivatives under the condition of constraining data and information

Mar 3, 2021 13:15 — 14:15 · DGG 2021
Prof. Dr. Hans-Jürgen Götze

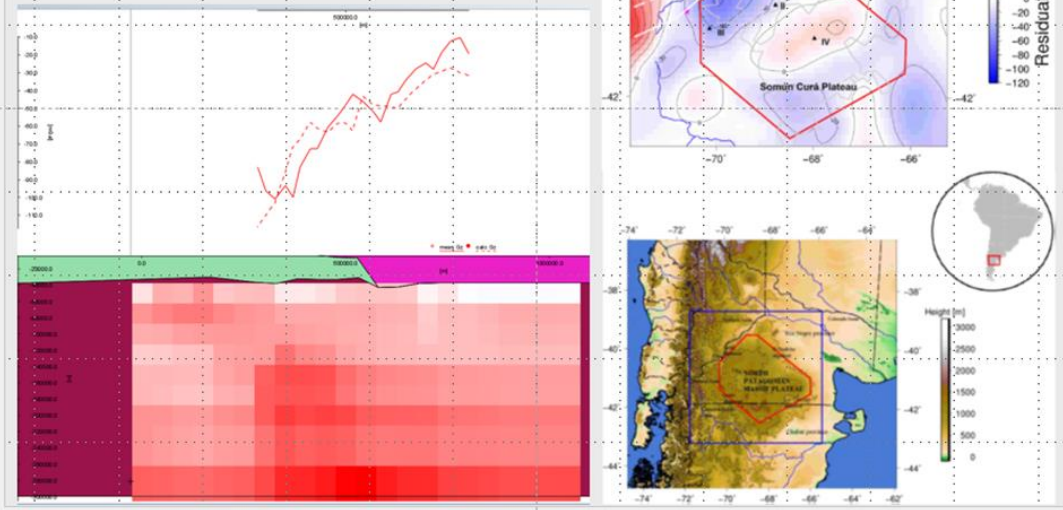
PDF DOI

Typical applications are modelling at a lithospheric scale:

(c) Hybrid modelling by voxels and polyhedrons

Gómez Dacal et al. (2017):

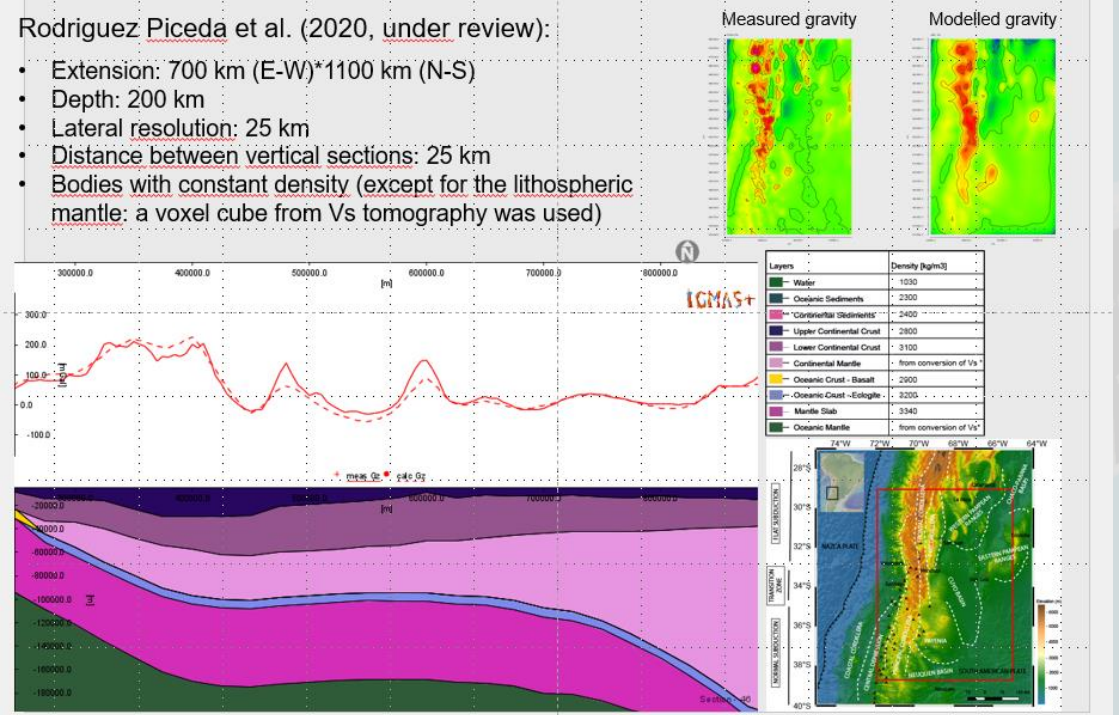
- Extension: 500 km (E-W)*500 km (N-S)
- Depth: 300 km
- Lateral resolution: 50 km
- Distance between sections: 50 km
- Tomographic models were used to create a voxel cube



(b) Input by interfaces/geological layers

Rodríguez Picada et al. (2020, under review):

- Extension: 700 km (E-W)*1100 km (N-S)
- Depth: 200 km
- Lateral resolution: 25 km
- Distance between vertical sections: 25 km
- Bodies with constant density (except for the lithospheric mantle: a voxel cube from Vs tomography was used)



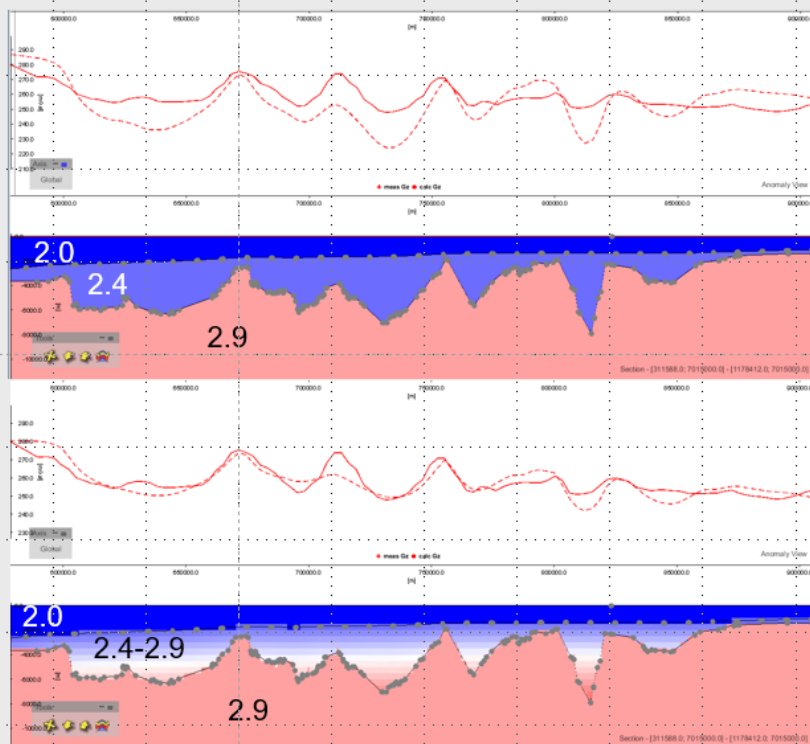
applications are n

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Vert. Exaggeration: 5

The improvement of the adaptation of measured and modelled gravity by introducing a stratified density distribution in the Earth's crust



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A 3D surface plot showing a complex, multi-colored surface. The surface has a central peak and several surrounding depressions or valleys. The colors transition from purple at the top to blue and then orange towards the base. The plot is set against a black background with a white grid.

A 3D geological model of the Geestacht salt dome. The model shows a central salt dome (grey) rising from a basement (blue). The dome is surrounded by various geological layers, including the Dogger (purple), U. Beta Sandstein (orange), and Dogger gamma (yellow). The model is oriented with North (N) indicated by a red arrow. A vertical scale bar on the left indicates depth in meters (0 to 1000 m). Labels on the right side of the model include: 'Geestacht', 'Basin Dogger (Hohlebecker Doggerberg)', 'U. Beta Sandstein', 'Dogger gamma', 'Dogger delta', 'Dogger epsilon', 'Bemmerli Sandstein', 'Sils (S. Sandstein)', 'Geestacht', and 'Geestacht'. A legend on the right side of the model identifies the layers: 'Geestacht', 'Basin Dogger (Hohlebecker Doggerberg)', 'U. Beta Sandstein', 'Dogger gamma', 'Dogger delta', 'Dogger epsilon', 'Bemmerli Sandstein', 'Sils (S. Sandstein)', and 'Geestacht'.

Grid data for 3D modelling by:
GOCAD
PETREL

Citing IGMAS+

How to cite

Please consider paying us back by citing [our articles and technical papers](#) when you publish papers containing results or illustrations obtained using **IGMAS+**.

Please also [use the official IGMAS+ logo](#) in your presentations and posters.

When in doubt, please cite the **IGMAS+** software as follows:

i Götze, H. J., & Lahmeyer, B. (1988). Application of three-dimensional interactive modeling in gravity and magnetics. *Geophysics*, 53(8), 1096-1108.

i [Application of three-dimensional interactive modeling in gravity and magnetics](#)

H.-J. Götze, B. Lahmeyer

Cite

DOI

and

i Schmidt, S., Anikiev, D., Götze, H. J., Gomez Garcia, À., Gomez Dacal, M. L., Meeßen, C., Plonka, C., Rodriguez Piceda, C., Spooner, C., & Scheck-Wenderoth, M. (2020, May). IGMAS+-a tool for interdisciplinary 3D potential field modelling of complex geological structures. In *EGU General Assembly Conference Abstracts* (p. 8383).

i [IGMAS+ – a tool for interdisciplinary 3D potential field modelling of complex geological structures](#)

S. Schmidt, D. Anikiev, H.-J. Götze, À. Gómez-García, M. L. Gomez Dacal, C. Meeßen, C. Plonka, C. Rodriguez Piceda, C. Spooner, M. Scheck-Wenderoth

PDF

Cite

DOI

IGMAS+ online tutorial

IGMAS+ Online Tutorial

1. Introduction

2. Setting up a density model

3. Modelling field components and gradients

4. Fitting gravity anomalies

References

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Getting Started
Requirements
License
Tutorial
Workflow Guide
User Manual

2. Setting up a density model

For the modeller, each compilation of a density/susceptibility model consists of two activities that result from a theoretical model. First, a body must be defined which contains a mass/magnetic material (here density and/or susceptibility), and the distances from stations where the gravity and/or magnetic fields were measured. Therefore, model stations must be defined (see below).

At first, the origin point of the model (its zero point) has to be fixed, which is not only the origin of model geometry, but also of model stations, of the corresponding gravity/magnetic fields which should be matched, of the voxel cube and of any available additional map information, for example from a geographical and/or a digitized geological map.

We start with the explanation on how to handle the bodies and continue with the explanation for stations.

2.1 Model bodies

In IGMAS+, density in space can be defined either in terms of

1. triangulated polyhedra surrounding a certain volume of constant density (Fig. 2.1) or
2. a 3D voxel cube (Fig. 2.2) containing numerous voxels, each carrying its own density value.

IGMAS+ Online Tutorial

1. Introduction

2. Setting up a density model

3. Modelling field components and gradients

4. Fitting gravity anomalies

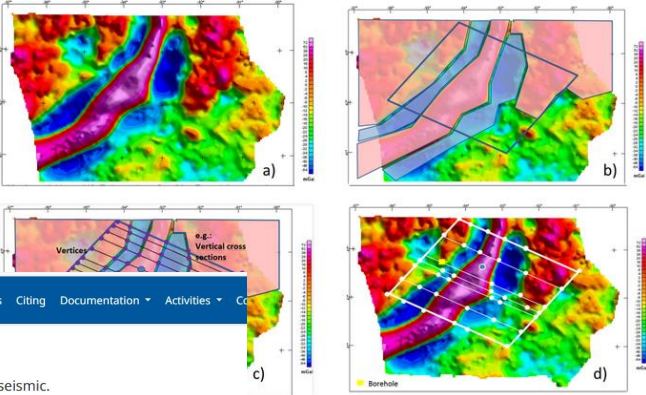
References

In case the model is built on **working sections** (Fig. 2.3), there are no vertices located between the working sections. The user therefore should define the number, spacing and horizontal orientation (strike direction) of these working sections

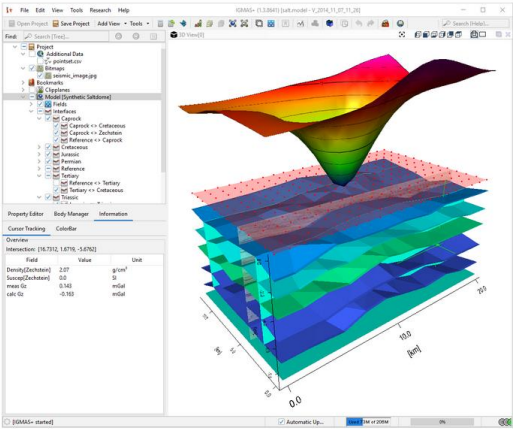
1. to keep sufficient control of model geometries throughout the interactive modelling process and

2. to allow for a proper analysis of elongated gravity anomalies (i.e., orient working sections perpendicular to the strike of major anomalies).

Working sections are always parallel (Fig. 2.4).



Important when defining the geometry of the model bodies by is should be modelled. (b) Select the area to be modelled. (c) modelled and define the intersections of the sections with the ctions and the intersections are really important to model the anomaly correctly.



Parameter	Value	Unit
Density(Densities)	2.00	g/cm³
Height(Densities)	0.0	m
Width(Densities)	0.0	m
Depth(Densities)	0.0	m

FIGURE 4.1: Screen shot

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Data Protection Declaration for IGMAS+ website and software

1. Description and scope of data processing

The IGMAS+ software is distributed via IGMAS+ website in a form of installer without source code. In order to use the user needs to have a valid license. To be able to provide a license, we ask users to fill a registration form and we collect the following information from them:

- Date of request
- Name, Surname
- E-mail
- Affiliation (if available)
- Address of organization (if available)
- Position (if available)
- Related webpage (if available)
- Purpose of software usage

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Interactive Gravity and Magnetic
Application System

User Manual

IGMAS+

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Posts

Security note: log4j library is not used in IGMAS+

IGMAS+ is not affected by the recently disclosed Log4Shell vulnerability.

Dr. Denis Anikiev

Dec 14, 2021 · 1 min read · Announcement

IGMAS+ Release v1.4.8707

This release adds a new WMS server, KML/KMZ file input and extends visualisation settings

Dr. Denis Anikiev

Jul 13, 2021 · 2 min read · Release

IGMAS+ Discord Server

Welcome to the [IGMAS+ Discord server](#)

Dr. Denis Anikiev

Apr 30, 2021 · 1 min read · Announcement

IGMAS+ Release v1.4.8690

This release adds new themes, graphic improvements and extends macOS support

Dr. Denis Anikiev

Mar 28, 2021 · 2 min read · Release

Data protection · Imprint

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Published with Wowchemy — the free, open source website builder that empowers creators.

Taskbar icons: File Explorer, IGMAS+, Firefox, Edge, Word, Excel, PowerPoint, Teams, Calendar, Mail, and others.

IGMAS+ Release v1.4.8690

Release notes

Dr. Denis Anikiev
Mar 28, 2021 · 2 min read · Release

Overview

Our new release will please users with a big variety of interface themes: 58 new themes thanks [JFormDesigner](#) were added.

IGMAS+

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Overview

Our new release will please users with a big variety of interface themes: 58 new themes thanks [JFormDesigner](#) were added.

In this version we payed special attention to the problems with installation on macOS. Now **IGMAS+** can be easily installed and started on macOS versions up to 10.13.

Unfortunately [OpenGL is deprecated](#) in macOS since version 10.14 Mojave. As a consequence, **IGMAS+** officially supports macOS versions only older than 10.14. We regret that this might cause serious inconveniences for macOS users.

Taskbar icons: File Explorer, IGMAS+, Firefox, Edge, Word, Excel, PowerPoint, Teams, Calendar, Mail, and others.

Suport and user interaction: Discord

https://discord.com/channels/837269435269513216/837454705529192518

Du möchtest mehr aus Discord herausholen - mit besserer Leistung, In-Game-Overlay und mehr? Hol dir unsere Desktop-App! [Download](#)

IGMAS+ **# welcome** Welcome to IGMAS+ Community

3 neue Nachrichten seit 15:37 am 12. Mai 2022 [Als gelesen markieren](#)

If you want to receive push notifications for e.g. [#announcements](#) you can certainly do that (check the notification settings!).

If you have found a bug or have a feature request, please send an issue to igmas-support@gfz-potsdam.de

Subscribe to the **IGMAS+ Users mailing list** to receive our newsletter, release notes and invitations to our events, simply send an e-mail to: igmas-users-subscribe@gfz-potsdam.de

Join the **IGMAS+ Telegram channel** to stay informed of the latest announcements: <https://t.me/igmas>

We want to foster a positive and welcoming environment!
We expect you to follow our [#rules](#) to fulfill this goal.

Thank you for choosing **IGMAS+** 👍

P.S. If you want to tell your friends about this server, use this invite link:
<https://discord.gg/uVnwS3U947> (Bearbeitet)

DU WURDEST EINGELADEN, EINEM SERVER BEIZUTRETEN

IGMAS+
3 online • 24 Mitglieder [Beigetreten](#)

Zeit für den Party-Modus
Um unseren 7. Geburtstag zu feiern, haben wir etwas ... Besonderes vorbereitet. Wir hoffen, es gefällt dir!

[Probiere es aus](#)
[Vielleicht später](#)

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Hajo #0255 Nachricht an #welcome

IGMAS+

Interactive Gravity and Magnetic Modelling Software

Contact

Send

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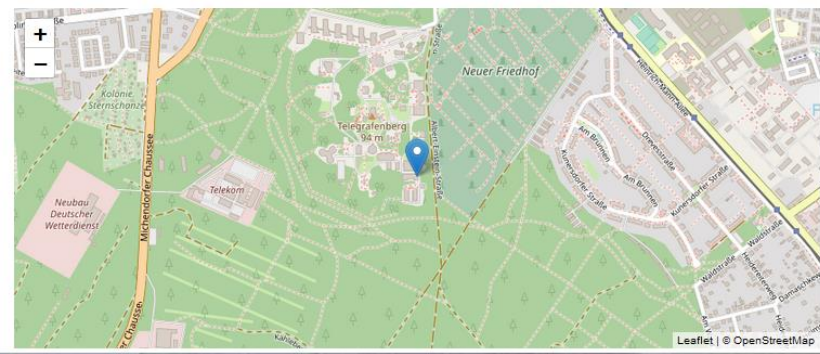
🗺 Enter Building C4, stay on the ground floor, turn to the left and go along the corridor until you find the office 1.10

🕒 Monday-Friday 09:00 to 18:00 CET

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If you want to request a license certificate please use [this request form](#).

If you have found a bug and want to submit an issue report please check instructions in the [IGMAS+ User Manual](#).

For any other questions please use the following contact form:

i Please note that the processing of the form data is done via the [Formsprees](#) webservice according to the [Data Protection Declaration](#)

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