# README – Archaeoastronomy Project

# Archaeoastronomy: Giza and Orion’s Belt Alignment  
  
This repository contains supporting data, models, and visualisations for the research manuscript currently under review at \*Nature\*, titled:  
  
\*\*"Orion Before Pharaoh: Archaeoastronomical and Hydro-engineering Evidence for a Pre-Dynastic Origin of the Giza Pyramids"\*\*  
  
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## Contents  
  
- `README.md` — Project overview and structure (this file)  
- `orion\_modeling.ipynb` — Jupyter notebook for simulating Orion’s Belt heliacal alignment from 4600 BCE to 2500 BCE using \*Skyfield\* and \*Stellarium\*  
- `nile\_level\_plot.py` — Python script for reconstructing mid-Holocene Nile flood levels and modelling access to Khafre’s U-shaped dock  
- `Figures/` — Includes published figures from the paper (e.g., Giza–Orion alignment, Nile regression map)  
- `Data/` — Raw datasets for Nile hydrology, pyramid angles, and radiocarbon dates  
  
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## Background  
  
This study examines why the architectural precision of the Great Pyramid, achieved without mortar, declined within a century. By using archaeoastronomical modelling and palaeohydrological reconstruction, the paper challenges the conventional dating of the Giza complex (c. 2500 BCE). It proposes that its orientation to Orion’s Belt and dock access patterns match better with a construction window around \*\*4400 ± 200 BCE\*\*.  
  
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## Installation (Optional for Python tools)  
  
```bash  
pip install skyfield pandas matplotlib numpy  
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## Citation  
  
If you use this repository, please cite the associated article (citation to be added upon publication).  
  
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