**ChETEC-INFRA Experimental Plan
AMS measurements at DREAMS**

Please provide a detailed description of the planned experiment including relevant technical details on **max. 3 pages (excluding the table)**. If possible, describe your sample(s) in detail including quantity, size, composition (how many layers, constituents of each layer, layer thicknesses), special demands, etc.

Main applicant (name, institution, country)

Jaqueline Bond, Her Majesty’s Institute, UK

Proposal title

Saving the world with AMS

Motivation & justification of beam time, and scientific background

I received orders from heaven to investigate these samples for AMS nuclides to cure cancer, Alzheimer’s disease and Parkinson. She told me that I will be also able to save the world from climate crisis when I have this data. A third-party funding agency granted me a lot of money for my projects, so I could hire 20 PhD students to finish my research asap.

If applicable, previous results on this topic (mainly related to the proposer's work)

Last year, I spent 300 days in Tibet to find the best-suited samples to solve all these problems. I wrote a book about this field-trip and won the Pulitzer Prize for it.

Description of the proposed experiment including most relevant technical data

All necessary individual data for later interpretation such as altitude, latitude, sample thickness (the upper 3-5 cm of the surface), topographical shielding, dip etc. have been recorded while field work.

All 42 samples and 6 processing blanks have been chemically treated to AgCl, BeO and Al2O3 with chemical yields of 90%. All samples have been analyzed for 27Al by ICP-OES to allow most-precise expected 26Al/27Al ratios before measurement.

Expected measurement time or sample preparation time if known and relevant to experiment

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **sample****name** | **sample material** | **AMS ratio to be measured** | **expected isotope ratiomin - max** | **expected measurement time (h)** | **sample preparation time** |
| 1a | limestone (AgCl) | 36Cl/35Cl | 3E-12 | 5E-12 | 1 | 0 h @ HZDR |
| 1b | quartz (Al2O3)  | 26Al/27Al | 3E-12 | 5E-12 | 1 |
| 1c | quartz(BeO) | 10Be/9Be | 3E-12 | 5E-12 | 1 |
| Blank | AgCl; BeO; Al2O3 | 36Cl/35Cl10Be/9Be26Al/27Al | E-16 | E-15 | 111 |
| Standard | AgCl; BeO; Al2O3 | 36Cl/35Cl10Be/9Be26Al/27Al | E-12E-12E-11 | 111 | 0 (provided by HZDR) |
| **Total beam hours** |  |  |  |  | **9** |  |

Next steps after beam time

Measured AMS ratios will be transformed to 36Cl in units of atoms/g(Ca) and natCl in µg/g. The Cosmocalc add-in for excel (Vermeesch, 2007) will be used to calculate atmospheric pressures and scaling factors, of pure spallation only, according to the polynomial of the scaling model of Stone (2000). If applicable, surface production was corrected for topographical shielding taken into account surroundings and the dip of the sample location. Combined AMS, chemical composition data and whole rock density will be used to determine precise ages via 36Cl-production calculation spreadsheet, which was originally provided by Schimmelpfennig et al. (2009) but later adapted by Braucher et al. (2011), who had first introduced a production rate for fast muons at sea level and changed production rates for spallation (sea level high latitude) and slow muons (sea level) accordingly…… Exposure ages will be discussed in the context of… ,
…..presented at international conferences and published together with HZDR coworkers in a high-ranking journal like Nature or Science. ;-) ;-) ;-)

Relation to Other Projects, Student Theses, etc.

[If this proposal is related to a thesis project, or other external projects, please note this here. In particular if this affects the potential time line for conducting the project.]

Support for Travel and Accommodation

[If financial support for travel and accommodation is requested, please outline the planned travel (number of scientists, duration), and the total amount of support requested.]

References

R. Braucher et al., Production of cosmogenic radionuclides at great depth: A multi element approach, Earth Planet. Sci. Lett. 309 (2011) 1..
I. Schimmelpfennig, et al., Sources of in-situ 36Cl in basaltic rocks. Implications for calibration of production rates. Quat. Geochron. 4 (2009) 441.
J.O. Stone, Air pressure and cosmogenic isotope production. J. Geophys. Res. 105 (2000) 23753.
P. Vermeesch, CosmoCalc: an Excel add-in for cosmogenic nuclide calculations. Geochem. Geophys. Geosystems 8 (2007) Q08003.

Further remarks

I personally think that DREAMS is the best AMS facility with the best equipment and nicest people world-wide…;-) ;-)…;-)

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