

Kortfattet dansksproget projektbeskrivelse egnet til publikation på dansk EMPIR hjemmeside

2016 Miljø	Metrology for Stable Isotope Reference Standards	
16ENV06	SIRS	
Projektets formål Klima forandringer er en af de største og risikofyldte udfordringer, som verdenssamfundet står over for i dette århundrede. De menneskeskabte stigninger i koncentrationerne af drivhusgasser er hovedbidraget til den menneskeskabte globale opvarmning, med et vægtigt bidrag i form af stigende CO ₂ og N ₂ O udledninger. For at hjælpe verdens regeringer med at kunne validere de opgjorte nationale udledninger og dermed bekræfte, at de nationale reduktionsmål overholdes, er der et behov for at kunne skelne de menneskeskabte udledninger til atmosfæren fra naturens egne udledninger. Den isotope sammensætning af drivhusgasserne er et redskab, til at bestemme det menneskeskabte bidrag til stigningen af drivhusgasserne i Jordens atmosfære. Disse målinger kan dog ikke realiseres med den eksisterende metrologiske infrastruktur. Formålet med SIRS er derfor, at forbedre målemetoderne for isotopforhold af de to vigtige drivhusgasser CO ₂ og N ₂ O. De mere nøjagtige målemetoder skal især hjælpe de internationale atmosfæriske overvågnings netværk (WMO-GAW), til at styrke opgørelsen af drivhusgasudledninger, og dermed opnå forbedret vurdering af, om målene fra COP-21 og direktiv 2008/50/EC overholdes. Dette bliver realiseret ved at forbedre nøjagtigheden i den isotope sammensætningen af reference gasser, samt ved at udvikle teknikker med der ved brug af optiske spektroskopi vil kunne opnå den nødvendige nøjagtighed til brug i felten. De målsatte nøjagtigheder er 0.1 ‰ for δ ¹³ C-CO ₂ og 0.5 ‰ for δ ¹⁸ O-CO ₂ .		
Projektet er delt op i 5 arbejdsopgaver: WP 1 New reference materials for δ ¹³ C-CO ₂ and δ ¹⁸ O-CO ₂ to uphold the global measurement infrastructure. WP 2 New international reference materials and scale for δ ¹⁵ Nα , δ ¹⁵ Nβ and δ ¹⁸ O-N ₂ O WP 3 Advancing optical isotope ratio spectroscopy for CO ₂ and N ₂ O WP 4 Creating Impact WP 5 Management and Coordination		
Antal deltagere 12	Projektets budget ¹ 2 255 924 EUR	Person-måneder 292,8
Dansk deltager DFM	DFM Budget ¹ 70 440 EUR	Person-måneder 6,9
Kontaktperson (navn, e-mail, telefon, adresse) David Balslev-Harder, dbh@dfm.dk , 2545 9026 DFM A/S, Kogle Allé 5, 2800 Kgs. Lyngby		
DFM's bidrag: DFM deltager i arbejdsopgaverne WP3, WP4 og WP5.		

¹ Angives som EU finansiering (direct costs + 5 %)

De faglige aktiviteter som DFM deltager i er:

- A3.1.1 PTB, Empa and VTT will agree on a protocol, which outlines the metrological characterisation of spectroscopic isotope analysers that will be developed and characterised in Task 3.1 and Task 3.2. The characterisation will address metrological principles and the WMO/GAW recommendations. DFM, RUG and NPL will review the protocol, and suggest revisions if applicable. The protocol may be adjusted in the course of the project, if necessary, and will be disseminated to the user community.
- A3.1.6 PTB, DFM, INRIM, RUG, and VTT will review and compare uncertainty budgets for OIRS measurements from activities A3.1.4 and A3.1.5. They will compile a report and identify strategies how to further improve the measurement uncertainty (target of 0.1 ‰ for $\delta^{13}\text{C-CO}_2$ and 0.5 ‰ for $\delta^{18}\text{O-CO}_2$) based on the main uncertainty contributors.
- A3.1.8 DFM, PTB, and VTT will evaluate and investigate potential improvements of spectral line data for CO₂ isotope analysers developed and characterised in A3.1.2 and A3.1.3. Line data will be measured according to the identified requirements. The line data shall be applicable to improve the analysers' spectral data evaluation and thus the uncertainty of calibrated $\delta^{13}\text{C-CO}_2$ and $\delta^{18}\text{O-CO}_2$ measurement results and support future absolute OIRS measurements.
- A3.1.9 Using input from A3.1.6, A3.1.7 and A3.3.4, PTB, DFM, Empa, RUG, INRIM and VTT will compile a validation report on at least two OIRS methods for CO₂ isotopes.
- A3.1.10 Once the validation report has been reviewed and agreed by the consortium PTB on behalf of DFM, Empa, RUG, VTT and INRIM will send the coordinator D6 "Validation report including a full uncertainty statement for at least two field-deployable OIRS measurement methods with an uncertainty target of 0.1 ‰ for $\delta^{13}\text{C-CO}_2$ and 0.5 ‰ for $\delta^{18}\text{O-CO}_2$ ". Deliverable D6 is the outcome of this activity.
- A3.3.1 RUG, DFM, Empa, MPG, NPL, PTB, TUBITAK and VTT will agree on a comparison protocol which outlines the comparison of OIRS instruments between partners and with IRMS instruments. The protocol will address specific requirements which stem from comparing OIRS with IRMS instrumentation. Led by RUG (CO₂) and Empa (N₂O), comparisons for CO₂ and N₂O will be planned in accordance with the identified requirements.
- A3.3.2 A comparison will be conducted for CO₂ isotopic composition, based on the protocol prepared in A3.3.1. The comparison will include at least 2 OIRS instruments from A3.1.2 and A3.1.3, as well as IRMS facilities from MPG, TUBITAK or RUG. DFM will use CRDS and TDLAS setups for the measurements. The instruments will be calibrated to the VPDB scale, and the new reference materials prepared in A1.2.1 will be used. The comparison results will be processed by the participating partners and reported to RUG.

De deliverables som DFM bidrager til, er

- D6: Validation report including a full uncertainty statement for at least two field-deployable OIRS measurement methods with an uncertainty target of 0.1 ‰ for $\delta^{13}\text{C-CO}_2$ and 0.5 ‰ for $\delta^{18}\text{O-CO}_2$ (M36) Maj 2020

- D9: Delivery of all technical and financial reporting documents as required by EURAMET.
(M36 + 60 dage)