REF2029

Research Excellence Framework
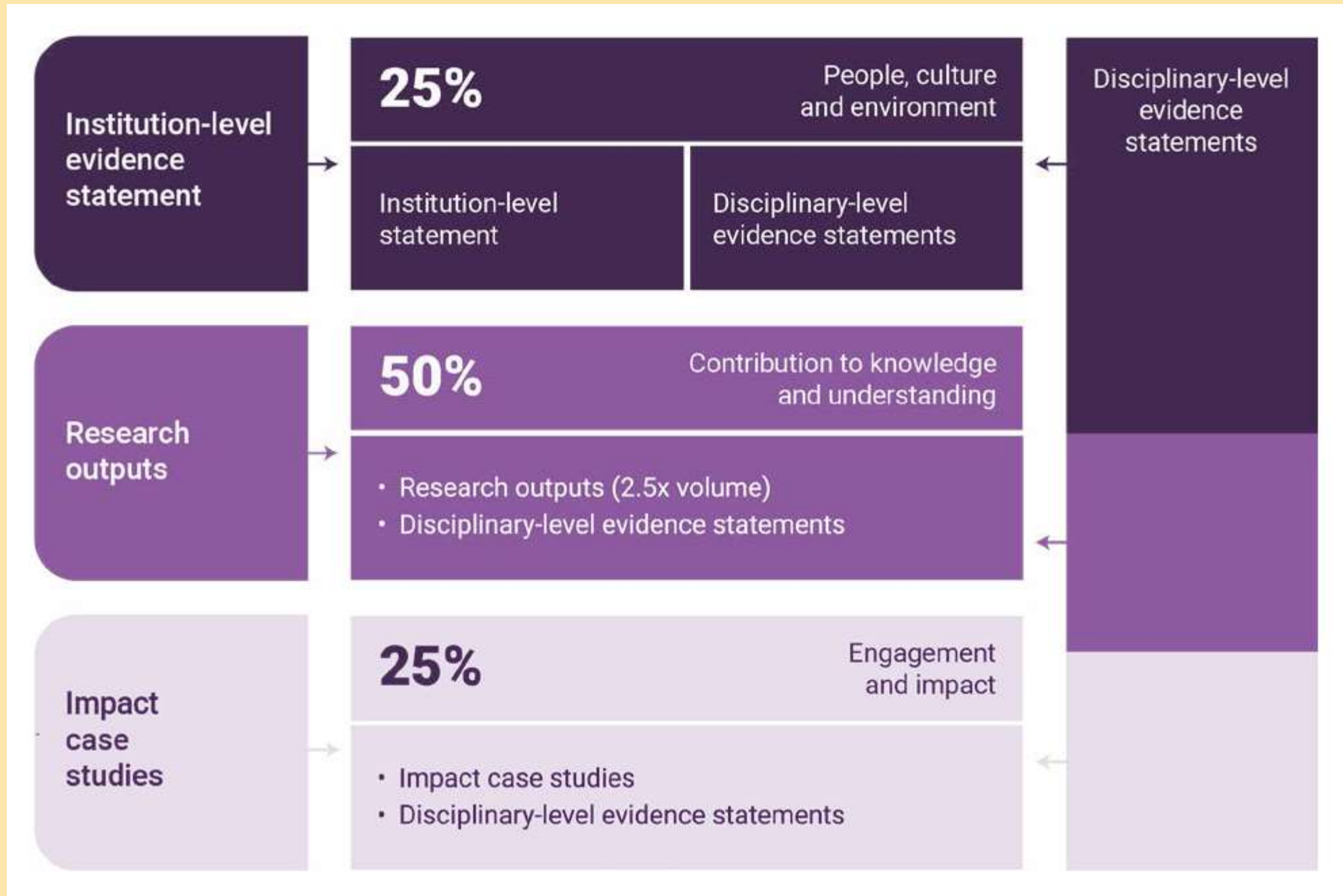
Richard Allan, Emily Black (UoA7 leads)

REF – you know all this, right?

- System for assessing quality of research in UK higher education institutions. Every 7ish years, next one 2029

- REF outcomes inform allocation of ~£2 billion/year public funding for universities' research. Also reputational importance.

- Process of expert review by sub-panels focused on subject-based units of assessment (UoAs), under guidance of main panels and advisory panels.

- The weather, climate, earth observation and space and environmental sciences divisions will submit under UoA7: Earth Systems and Environmental Sciences

- REF period: January 1 2021 – December 31st 2028

Details: https://research.reading.ac.uk/meteorology/intranet/ref/ (met1965)

REF2029

Institution-level evidence statement →

25% — People, culture and environment

Institution-level statement | Disciplinary-level evidence statements

Research outputs →

50% — Contribution to knowledge and understanding

- Research outputs (2.5x volume)
- Disciplinary-level evidence statements

Impact case studies →

25% — Engagement and impact

- Impact case studies
- Disciplinary-level evidence statements

Disciplinary-level evidence statements ←

REF 2021:
Environ.: 15%
Outputs: 60%
Impact: 25%

Key features of REF 2029

- De-emphasis on individuals; staff will not be submitted to REF2029
- "Volume" of eligible staff determined by Higher Education Statistics Agency (HESA) from 2025/26 and 2026/27 data
- Outputs submitted = 2.5 times this "volume" of staff.
- Output eligibility is same as REF2021, same open access policy applies until new guidelines are published
  - Changes in content and weightings of components, increased emphasis on culture & environment, less on outputs
  - Broader definition of research excellence
  - No cases for output reductions or personal circumstances
 - Data and narrative templates to inform environment statements

Ongoing Activities

1) **ROSS output selection**: ≤5 that will score highly in REF (Grade 7+): centaur.reading.ac.uk/ → ROSS Report (left tab) > ROSS Selections

2) **Calibration Exercise** (required by central REF team)

3) **Assess outputs on REF Tool** ("light touch") by all of us (Grade 7+)

4) **People, Culture & Environment** (PCE) pilot (data gathering)

5) **Impact**: Emily Black is leading activities on our Impact Case Studies which some of you are involved in
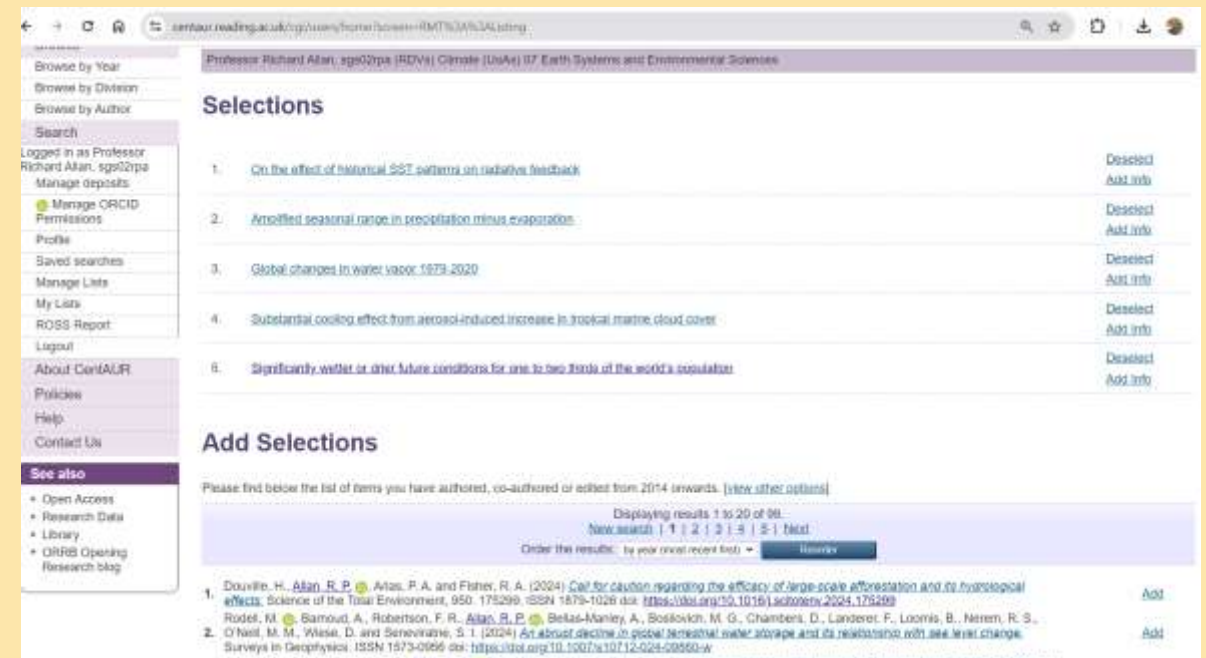
Calibration Exercise Results (1)

- Radiative efficiencies of agricultural fumigants
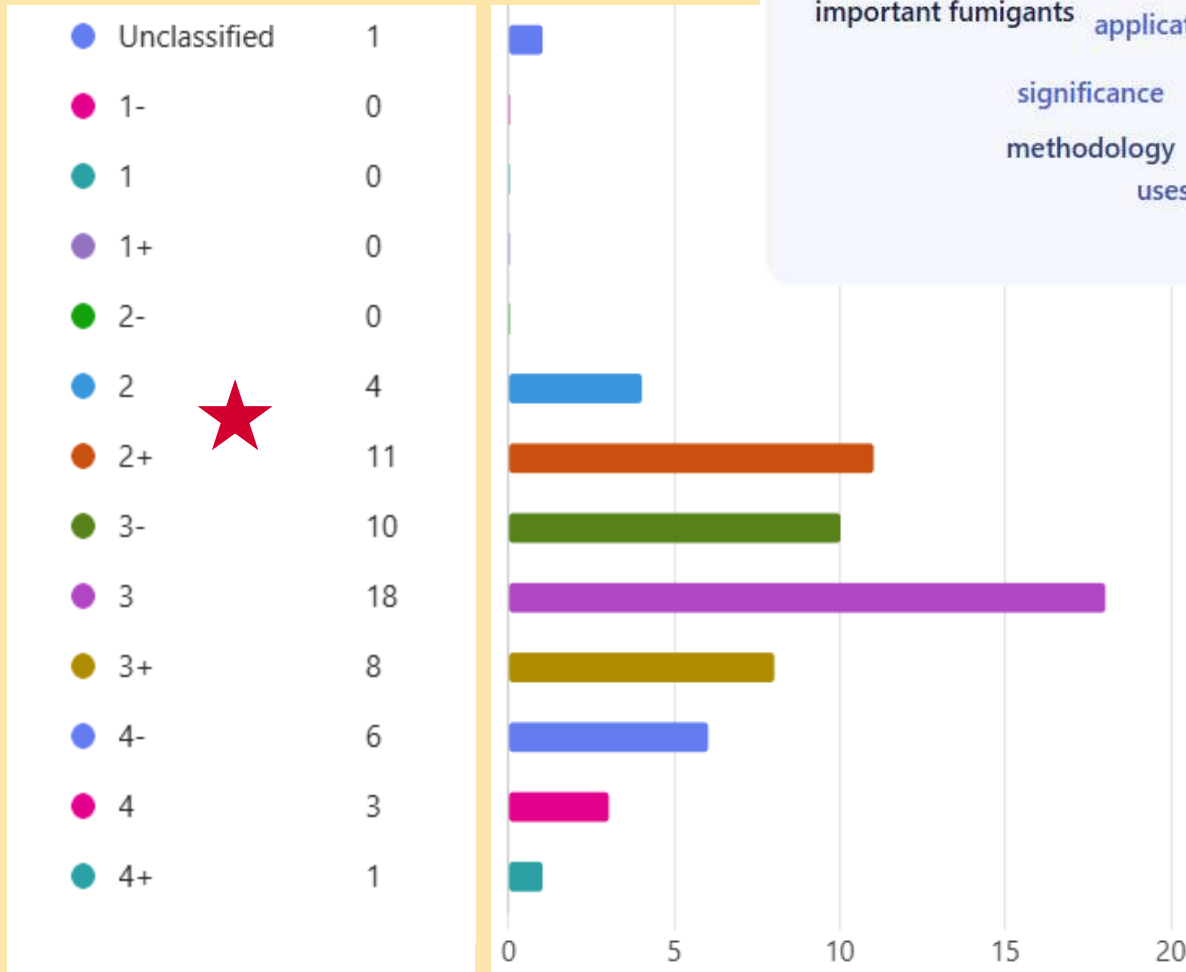
9 respondents (29%) answered Incremental for this question.

important fumigants application **policy** clear rigour policy makers important results

significance impact **Incremental** **important** alternative fumigants

methodology scored new paper **fumigants**

uses chemicals Warming Potential

	Count
Unclassified	1
1-	0
1	0
1+	0
2-	0
2 ⭐	4
2+	11
3-	10
3	18
3+	8
4-	6
4	3
4+	1

Mr Chat summary of comments:

- scientifically rigorous but incremental
- methodologically sound, clear, careful
- first to provide estimates for specific chemicals, policy relevant
- uncertain impact, lack of citations
- *I am not qualified to judge*

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Calibration Exercise Results (2)

- forestation's CO_2 removal benefits
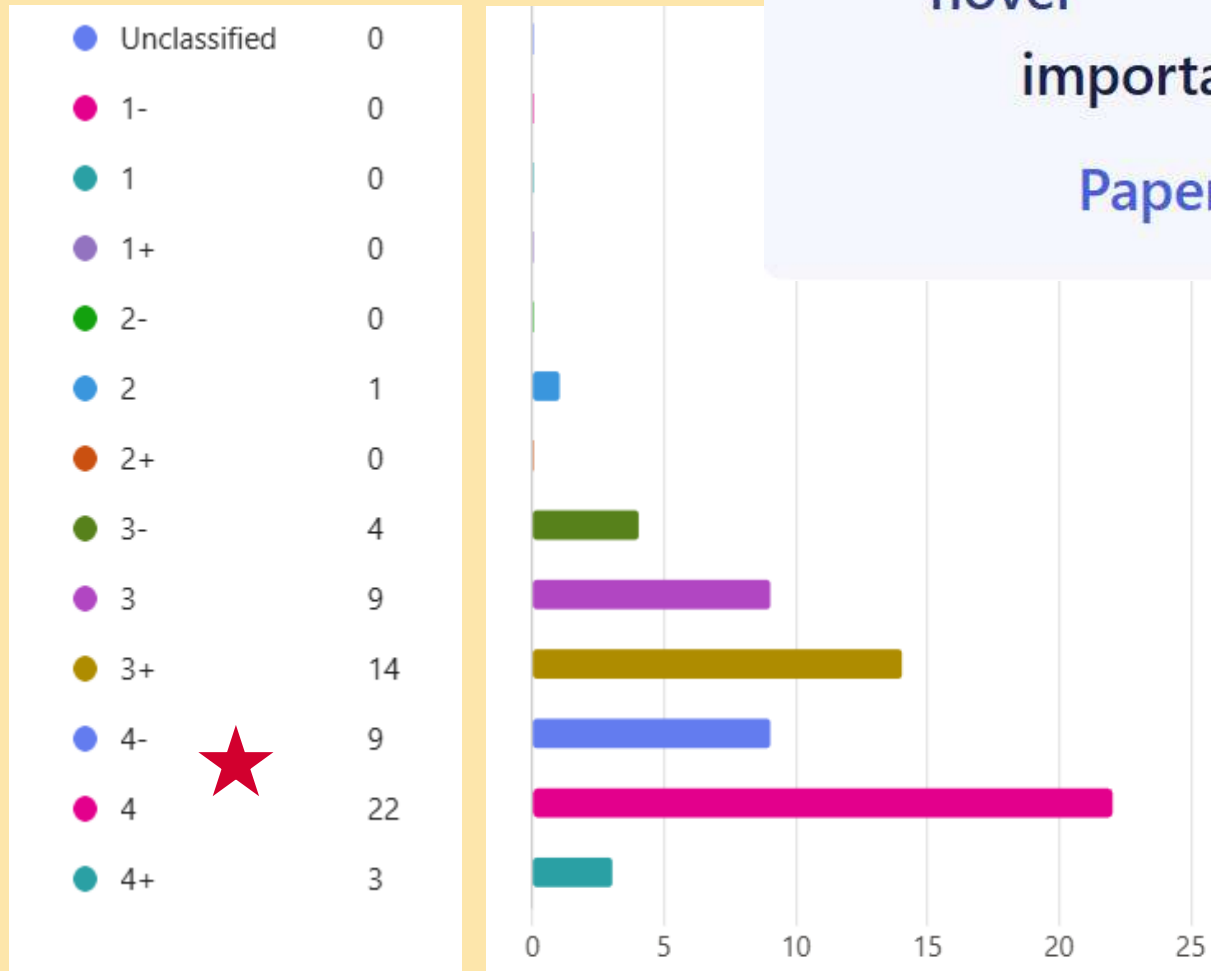
16 respondents (52%) answered models for this question.

novel

important

Paper

climate change

models

impacts

Unclassified		0
1-		0
1		0
1+		0
2-		0
2		1
2+		0
3-		4
3		9
3+		14
4-	★	9
4		22
4+		3

Mr Chat summary of comments:

- important for the field, solid research

- builds on prior work, clear/concise

- difficult to follow, insufficiently supported, model-only

- *Should be a 4 as in Science*

- *I am not qualified to judge*

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Calibration Exercise Results (3)

- horticultural soil amendments

● Unclassified	1
● 1-	0
● 1	2
● 1+	0
● 2-	0
● 2	10
● 2+	15
● 3-	11
● 3 ★	9
● 3+	12
● 4-	2
● 4	0
● 4+	0
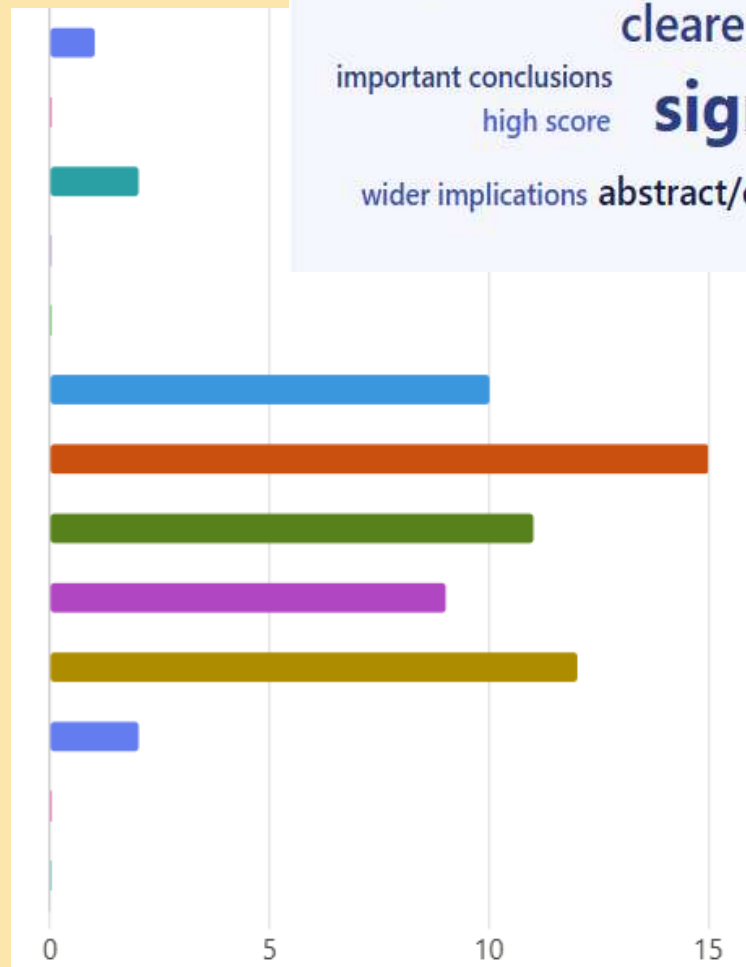
7 respondents (20%) answered paper for this question.

explanation of this result

clearer **impact** important result

novel results findings of the study main results

important conclusions

high score **significance paperDifficult** soil field experiments

novel study Experimental study

wider implications abstract/conclusions

n't been made clearer abstract is not

Mr Chat summary of comments:

- technically strong, variable opinions
- Rigorous, extension of previous work
- narrow scope, technical/jargon
- Expanding discussion to real-world applications could improve?
- *I am not qualified to judge*

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Calibration Exercise Results (4)

• Global Carbon Budget 2023
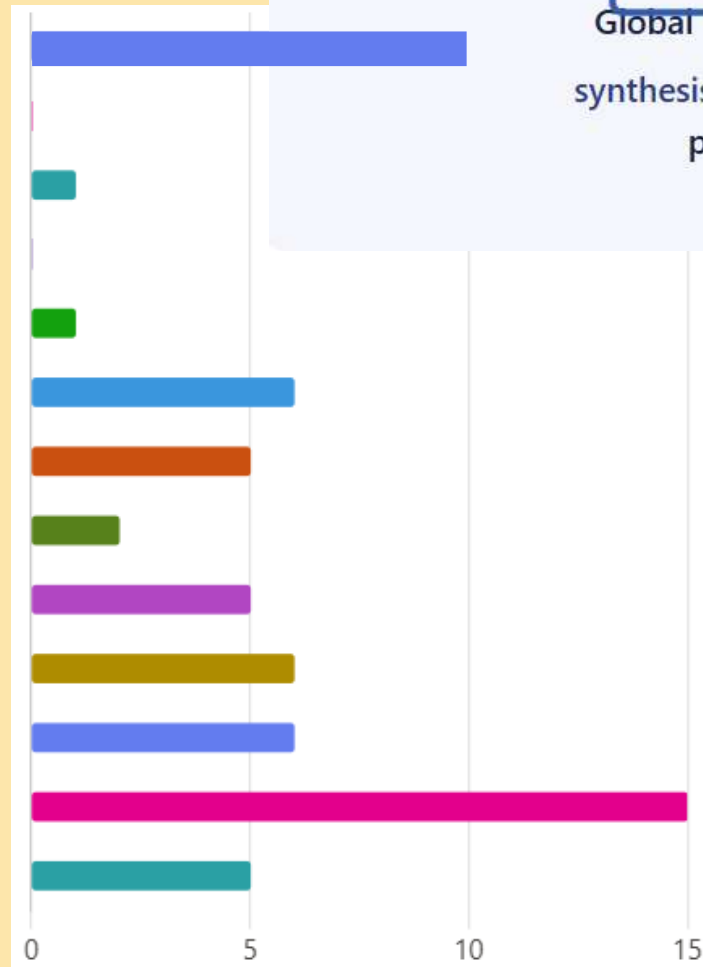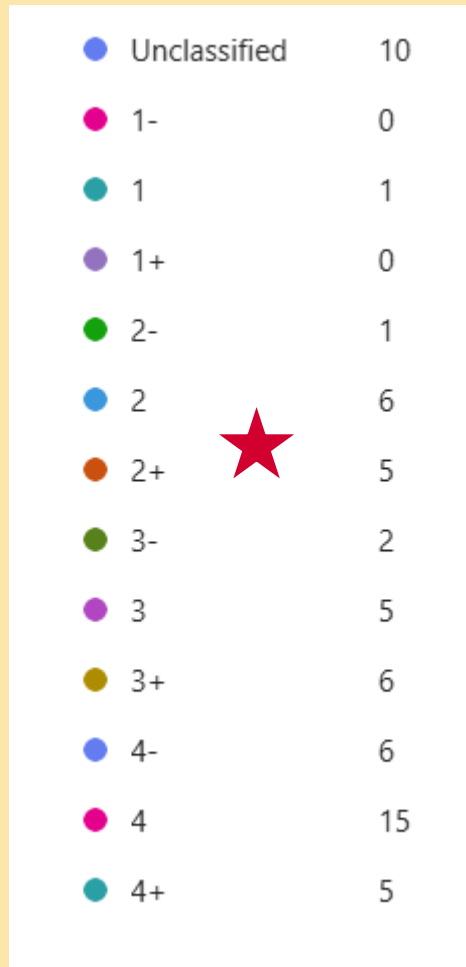
17 respondents (40%) answered paper for this question.

carbon budget

Global

synthesis

policy new

*update

paper being only incremental important paper

paper incremental

scores review incremental changes

high impact

Unclassified		10
1-		0
1		1
1+		0
2-		1
2 ★		6
2+		5
3-		2
3		5
3+		6
4-		6
4		15
4+		5

Mr Chat summary of comments:

• Essential reference in climate science

• Highly Influential but Incremental

• REF Eligibility Concerns

• Strong Methodological Foundation

• *I am not qualified to judge*

Reflection

- Expertise bias (can go either way)
- Journal bias (it's in Nature so it must be 4*/1*)
- Reputation bias (all Keith Shine's papers must be 4*)
- We can all improve the impact of our papers by taking care with <u>abstract</u> and conclusions, covering the "so what?" question, avoiding excessive caveats
- Recall the <u>Writing for REF workshop</u> led by Danny Feltham

- REF scoring ≠ paper quality/usefulness
- Second guess REF panel (not direct expert, may not like model-only papers, etc)
- Need to eliminate 2* tail and maximise 4* stonkers
- *Any other thoughts…?*

Next steps

- 1) Reflect on scores in context of overall score and range
  - Think about our own papers/abstracts/conclusions: can we improve perception of clarity (any jargon?), importance/impact in wider context, not left with "so what?"
  - Remember to use PRO process to enhance impact of papers in progress
- 2) Begin the actual assessment of outputs
  - Light touch, if it's obviously not a 3 or 4* then no need to spend too long
  - So far 300+ outputs to share amongst ~100 (so about 3x2 each)
  - We will begin assigning outputs in the REF Tool (2 per paper, 1 month deadline)

Your Output Assessments

These are the assessments assigned to you individually, if you wish to see assessments for your unit, please click the adjacent button.

All
Complete
Assess

To view the assessments for your unit, please click the button below.

Unit Assessments

107478 (Published Apr 2021): Changes in future precipitation mean and variability across scales — **Deadline: 27/03/2025 (24 Days Remaining)** — *Content Assessment, Not Scored*

107472 (Published Nov 2021): Evolving CO2 rather than SST leads to a factor of ten decrease in GCM convergence time — **Deadline: 27/03/2025 (24 Days Remaining)** — *Content Assessment, Not Scored*

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Other particulars (see <u>website</u>)

University of Reading

- **Eligibility:** original, 2021-28 period, open access (on Centaur within 3 months/OA)
- Outputs need to have a 'substantive link' to the University of Reading (those authored solely by PhD students or on teaching-only contracts are not eligible)
- Outputs will be considered eligible where there is a demonstrable and substantive link to the submitting institution within the REF assessment period. This includes outputs produced by anyone employed by the institution on a minimum 0.2 FTE contract for at least 6 months in the REF assessment period (see points 24/25 REF consultation document)
- So publications by retiring staff and new staff count assuming the staff member has worked at least 0.2FTE for at least 6 months during the REF period
- **Portability:** New staff can use their publications from old institute so long as they're eligible (e.g. open access criteria, need adding to Centaur to select on ROSS) **TBD**
- Writing for <u>REF Workshop</u> provides useful resources

2029 Preparation: REF Engagement and Impact

- Engagement and Impact (used to be just 'Impact') will be ~25% of the REF
- Two components:
  - Impact Case Studies
  - People, Culture and Environment statement
- Updates:
  - 10 case studies on the priority list within Meteorology and SAGES
  - Other impactful work remains on the impact pipeline, but will get less focus from the University impact team
  - <u>A strong impact pipeline, and inclusive 'impact culture' is crucial for the PCE statement</u>. Therefore, I will not be focusing only on the priority cases, but also on other impactful activity in the Dept
  - Next steps will be for me to have individual discussions with each ICS

2029 Preparation: REF Engagement and Impact

Resource:

- UoA7 has been allocated £15K per year for priority cases only (First lot of funds to be spent April 2025-July 2026). Funds will be held by me and distributed to ICS leads following a light touch, iterative assessment process
- Policy fund (needs to be spent in a hurry): up to £8K and in addition, some time with a policy consultant'

Extra slides…

- Current recruitment of REF sub panel members, details here:

https://2029.ref.ac.uk/panels/ref-2029-main-and-sub-panel-recruitment/

Possible contribution from University to individual toward workload support?

THE REF TOOL

University of Reading

https://www.reading.ac.uk/research-services/research-outputs/ref-tool

Read REF Tool Guidance for Assessors

- Researcher selects output in ROSS

Output selection (in ROSS)

Output Assessment (REF Tool)
- UOA Lead allocates assessor from established pool
- Can use external when no internal expertise

- 2 Assessors receive notification & score against REF criteria

Assessment

UOA Lead score review
- UOA Lead seeks moderation or further assessment if scores unaligned

- UOA portfolio
- Individual scores to all co-authors

Reports (REF Tool)

Automatic daily feed from ROSS to REF Tool

Under development

How the components are judged

The criteria for assessing the quality of outputs are 'originality, significance and rigour'.	
4*	Quality that is world-leading in terms of originality, significance and rigour (agenda setting, new concepts, highly novel, major influence)
3*	Quality that is internationally excellent in terms of originality, significance and rigour but which falls short of the highest standards of excellence (significant/lasting influence, novel)
2*	Quality that is recognised internationally in terms of originality, significance & rigour but aspects considered incremental
1*	Quality recognised nationally in originality, significance and rigour but incremental with only minor influence & significance
Unclassified	Quality that falls below the standard of nationally recognised work. Or work which does not meet the published definition of research for the purposes of this assessment (e.g. review)

Score/Comments: Shine & Kang (1)

2+ International standard with new calculations not previously conducted; rigorous and useful for informing policy for specific pollutants; quite specific, technical and incremental (no citations)

4- This is a good complement to the literature on GWPs, both scientifically interesting and policy-relevant - a clear abstract, with a clear summary of what was found.

3- hesitated with firmer 3* as paper could be interpreted as "ticking off molecules", so incremental in nature…. small impact of molecules tested could also work against significance of work.

2+ Careful study, which would receive a high score for rigour. The scientific advance is somewhat incremental (application of well-established methodology) but the findings could be highly significant for future studies of radiative forcings. The reach is so far not clear - with only one citation since publication in 2023.

2+ Incremental: uses existing methods and literature values, but applied to new fumigants, hence 2+ I am not qualified to judge this paper; however, it reads as a fairly routine application of known science using widely available data. Carefully done and, of course, with impactful outcome, but something I'd expect to see from a (very good) MSc dissertation.

3- The rigour in this paper was strong. The abstract is worded in a way that suggests that this is an application of an existing methodology to new species and hence scores low on originality. It is not clear to what extent these results might affect the use of these chemicals.

3- Originality: first to do calculations, but methodology not new (I think?), Significance: unclear - how widely used are these chemicals, are there regulatory/policy implications? Rigour: study seems carefully done with consideration of uncertainties.

3 First time to provide estimations of the 100-year Global Warming Potential with uncertainties for 4 alternative fumigants: ethyl formate, cyanogen, hydrogen cyanide and phosphine.

3- seems somewhat incremental, I hesitated with a 2 because it ticks the "significant influence on users, policy makers, production and/or management" box for a 3

2 Unlikely to have lasting impact on discipline because derived GWP100 values of 4 fumigants explored are so small in comparison with that for sulfuryl fluoride which is already known.

3- Application of existing techniques to important examples which hadn't been done before to obtain valuable results.

3 Certainly could be influential but possibly incremental too.

2+ Sounds important but these chemicals have little impact compared to other fumigants, using established techniques.

3 Provides a clear and considered answer to an important question using already established methods and data.

4- Good motivation and connection to impacts. The results are novel, but my slight hesitation is the extent to which this methodology is novel or just something used on many other gases (but maybe that doesn't matter very much).

3 Highly rigorous, novel information, and impacts the debate on what to use to replace certain products used in agriculture, producing actionable information to inform what to use. I would have scored it more highly if it had motivated the paper more to say how important fumigants are in general as an anthropogenic forcing (if, indeed, they are important).

3 High originality - first time that the global warming potentials for these specific chemicals have been estimated. Reasonable significance and rigour, but not top level.

3- Important result, but using standard approaches so could be perceived as incremental?

4- Major influence; some writing a bit platitudinous

4 An important contribution but perhaps needs a bit more context for the extra *

3- Novel results, careful (rigorous in conduct and discussion) which will have influence on policy makers but scored 3- as I feel academically it could be considered incremental (established thinking about GWP assessment applied to different compounds)

3 A solid piece of work

2 This is very incremental - essentially the turning of a sausage-machine handle with some slightly different ingredients. If it continues to lack citations it could be argued down further, although it does have impact outside academia, and has quantified something never previously quantified

3 Not my area of expertise, but seems to be in a reasonably good journal and reports a clear result that has been derived with rigor, but only contributes a to a minor GWP impact

3 I needed to read the paper in more detail to understand how important it was to find an alternative to sulfuryl fluoride, especially what GWP100 meant.

2 Seems to be only one partial element of a more complex overall question

2+ Internationally useful to have new numbers for warming potentials of alternative fumigants, but no new techniques used or mechanistic insights gained

2+ Seems very original, found it more difficult to assess rigour and significance - could initiate new policy around fumigants though also seems to be some uncertainty at this stage around values calculated (may have misunderstood this though!).

2 This work seems crucially important - I assume (and hope) that it will have a big impact. However the methods are described as "standard" and the important results are just numbers. It doesn't seem to be game changing scientifically, although hopefully it will be game changing in agriculture and the environment.   The work is done with the highest standards of rigor.

Score/Comments: Weber et al. (2)

4- World leading significance in terms of policy; rigorous and novel with substantial impact on discipline; novelty is highlighted though primarily model based (could observations be incorporated, highlighted more and would a concluding paragraph strengthen the perceived impact above the final statement, which does highlight the wider implications?); High citations (16 since 2024)

4 Good and clear abstract, summarising well for the non-specialist the point of the study and the conclusions. Important study relevant to understanding climate change.

3+ Very interesting application of Earth System modelling, but probably not significant enough for 4*. Pure modelling papers also have a harder time, I think.

4 Rigorous multi-model study that introduces highly novel theory on mechanisms for carbon sequestration in afforested regions. Clear reach and significance for climtate projections.

3 Relevant to global mitigation strategies, holistic overview of forestation impacts. Of international relevance. No separate discussion/conclusions so have to read all of results to assess implications.

3- I am not qualified to judge this paper; this reads as a typical 'ran model with a change, reported result of change' paper. In itself unoriginal science and not very interesting. Obviously, the question posed is of enormous societal impact , and I put the paper in a 3 category as a result. Even that said, however, the main scientific result seems to be that benefits of reforestation are partially offset by decrease in albedo, yet little is made of the observation that one model has substantially different albedo to the other.

3+ The significance of this work is extremely strong as the paper shows that the climate benefits of forestation could be considerably lower than assumed. The rigour is strong in that it uses more than one model. The originality seems strong, but more clarity on whether this is a step change in approach would have given a higher score.

4- Originality: difficult to tell from outside field - but published in Science which I have weighted strongly in my score; Significance: obvious importance for climate policy and practice; Rigour: no discussion on how good the climate models are(? maybe in supplementary that I did not read); only two models used, but statistical significance evaluated..

4+ First study demonstrated that Chemistry-albedo feedbacks offset up to a third of forestation's CO2 removal benefits using two Earth system models. It is of Importance for climate changes strategies that achieve the 2°C Paris Agreement target.

3+ A solid 3, however reliance on models (and just 2 of them) limits impact on the field. Also not clear there are new concepts or new methods.

4- Important study for considering climate change mitigation strategy. Robustness from considering 2 scenarios for climate change and using 2 models.

3+ Combination of existing ideas and techniques to produce a novel and valuable assessment of question of global importance.

4- could be highly influential, possibly not highly novel as well

3+ Maybe should be a 4? It is in Science!

4 Developed novel forestation scenario and new model runs to answer an important question with policy implications.

4 Very clear motivation, well explained potential impacts. (No Conclusions section in Science?)

3- Sets out a gap nicely, and appears rigorous. Clearly could have a large impact globally, so of high significance in an important area. However, it quickly gets difficult to read/dense due to the simulations and detailed discussion of chemistry/forcings. The conclusions are all at the start - it would be nice to have a brief section at the end re-iterating these, perhaps in more detail, although I guess this is not the Science/Climate Change style. The strongest findings are for a 4C increase, and it's unlikely that we will hit this temperature rise in my opinion.

3+ High significance and rigour, but not clear if this is the first estimate of reforestation impact, so not fully sure about originality.

3 Is the use of only 2 models an important limitation? Otherwise I would have gone higher.

4 The format of the journal (no conclusions section) makes it difficult to skim and get the main results/impact.

3+ Highly novel in terms of thinking, but concerns about rigour regarding model setup

4 Seems a useful advance but not a solution in itself

3+ Trying not to be swayed by the fact that this paper is published in Science. The finding that afforestation produces net warming effect, which offsets up to a third of the CO2 removal benefit seems major but I was not able to judge from my reading if this paper is at the forefront of this thinking, or, more in the realm of making a contribution to existing thought in this area.

4- In a high-profile journal but it seems the points have been made before (just not together) and likely quite model-dependent

4- Paper represents a significant advance in understanding of forestation as a way of limiting climate change and draws attention to various co-dis-benefits from a climate point of view. If it garners significant citations and follow on work, it could be a firm 4*

4 Paper in a top-ranked journal that provides a global estimate of a vey important process

3 A multi-model analysis would allow better grasp of uncertainty, but otherwise clear outcomes and impact on policy.

3 Did not give higher score because it is only based on models, so don't think it can be a 4.

3 Lasting international influence, including on policy makers. Techniques used are standard (models, secenarious etc.), but potentially strong influence on policy makers

3- Perhaps scores lower on originality as potential effects of forest been noted before (see intro), novelty here seems to be the scale-up to global however unsure how well models perform to explain current situation and no observations to validate model (didn't see a validation - apologies if I missed it). Potentially highly significant providing quantitative estimate of forest effect at a global scale.

4 Seems like rigorous, ground breaking important science to me

Score/Comments: Duddigan et al. (3)

3+   International standard of rigour and significance; could novelty and wider implications be emphasised more? Quite technical (what is the tea bag index?); quite low citations (4 since 2022).

3   The abstract is not particularly clear to the non-specialist. What are the conclusions?

3-   Very much outside my area of expertise so hard to give an accurate score. It wasn't clear to me how important the results were in wider context

3+   The impact couldn't been made clearer in the abstract (to be honest I had difficulty understanding the jargon, which I am not familiar with).

3-   Looks like a potentially important paper, but it is written in a very technical way and the significance of the key results is difficult to grasp.

3-   This is a signficant study, in terms of advancing our understanding of the impact of compost on carbon storage in soils. This would get a good score for originality and significance. However, the rigour score was reduced because of the small sample size and lack of consideration about how generalizable the results are.

2   Largely impenetrable to non-expert on read of abstract/conclusions. No clear statement of application of findings.

4-   I am not qualified to judge this paper; the subject matter is difficult, important and of global significance. The results are well-presented; I put this in the 4 category as it results from extensive controlled field experiements, not just model estimates. This is the science required to produce the models.

2+   It was not at all clear what the main finding of this study was. This seems to be original innovative research in a well-designed field experiment. The description of the analysis suggests it is rigorous.

3+   Abstract does not state wider implications; Conclusion ends a bit downbeat regarding uncertainies. Such a careful 7-year experimental study seems difficult to achieve and hence high marks on rigour and originality.

3-   I struggled with the jargon in abstract (just saying "compost" as in the conclusion could have helped, but there are many other technical terms). "significant influence on users, policy makers, production and/or management" is not clear (sounds niche although admittedly I'm not in the field)

2+   I love the idea of burying tea bags with different characteristics in soil as part of the scientific experiment. Interesting work with potential for significant implications though robustness probably not strong enough for high score (one potentially important result is expressed as "could").

2   Supports existing ideas and numbers, of international relevance.

2+   possibly influential, but findings not clearly stated and conclusions tentative

2+   Seems a very small study? Wasn't sure what it was recommending.

2   Long term field experiments providing insight into what feels like an important problem, but limited context given in the abstract and conclusions around the importance or implications of the work, and lots of technical terminology meant I couldn't understand even the main results. (my impression may well be different if I had more expertise in the area)

2+   I understood the framing question (I think), but the abstract was otherwise very difficult to follow - I was not sure what the novel results were, or what impact/importance they had. The conclusions were slightly better, but again it was difficult to determine whether this was a scientific advancement.

2+   I'm finding difficult to judge the extent of the influence on the discipline.

3+   Seemed rigorous, but I thought the resulting impact of this would not be large, and it did not seem to me to have found a huge research gap.

3-   Experimental study providing new data so originality is decent. Not clear if similar studies have been done before though. Only really one type of plot presented through paper - histogram analysis, so rigour could be higher. Reasonable significance as recommendations for the community provided based on results presented.

3-   A little worried about the representivity of the results - I found it hard to get a clear sense of that

2+   Too specialist and too much jargon in abstract and conclusions meant it was hard to see what was new and what the implications were

2   I felt it was missing a breakdown into non-expert language of the main impact and findings of the study, which prevented it getting a higher score from me.

U   Solid paper, but quite specific, incremental aspects

2+   Difficult to determine impact of work

3   Novel study in horticultural soils with novel findings that make an important contribution to understanding the dynamics of C amendments in soil with also relevance to practice

2   I cannot make any sense of the stated conclusions

3+   Appears a strong and novel study with important conclusions for maintaining soil organic material. Citations so far a bit modest but could change

2+   The aim of the paper looked to be of significance but found it difficult from the abstract and conclusion to gauge the potential impact and broader outcomes.

3   my area of expertise… paper describes experiment carried out with rigor which has implicaitons for important process. The context is a little narrow in the framing since horticulture does not cover much of the land surface.

2   Did get a sense of practical use, but not whether there were new methods introduced or new compost mixtures proposed

1   Does not seem conclusive enough to be a 2.

3+   While standard techniques have been used, the findings have wide-reaching international consequences for land management and related policies. Findings are incrementally novel

3   Rigorous experimental design. Quite complex abstract to follow but provides explanations for multiple aspects of what is controlling the carbon availability. The conclusions are clearer in terms of the significance of the work.

3+   This paper is so far out of my field of expertise that I have little idea of how novel or important this is. The paper doesn't cite other papers that report on similar experiments so the experiment is probably novel. The results seem to be part of an extremely important topic. But the results have caveats and are perhaps a small part of the bigger story.   The first part of the abstract described the experiment and methods. The important result (from the abstract) is, I think: "Results indicated that the difference in total C concentration between treatments resulted from an increase in unprotected, free, particulate organic matter (fOM), rather than an increase in soil organic matter being occluded in aggregates or in organo-mineral complexes, and that C persisted in the fOM fraction as a result of accumulation in the alkyl C region." The rest of the abstract included explanation of this result.

Score/Comments: Freidlingstein et al. (4)

2   Extremely high impact on policy and discipline with massive citation rate (356 since 2023) but incremental since it is an annual update so it may be a risk to show that new thinking and tecniques are incorporated and how much the results advance what is already known.

3   This is a really important paper with policy-relevant conclusions - but I'm not sure how innovative it is compared with the previous publications of the Global Carbon Budget. This is a tricky one to score. If importance of work and clarity of approach are most important it should get a 4, but if 'innovative science' is more important then it gets a lower score.

3+   Globally important, but may be seen as incremental in terms of methods?

Unclassified   It is a tricky one. It risks being seen either as a form of review (the abstract describes the paper as a "living-data update") or as incremental, which it is by design.

2-   This paper has rigour, but loses marks on originality (because it is an update). In itself, it is not hugely significant because of the existence of the previous updates - making it (by design) incremental.

2+   Appears to be an incremental assessment of the carbon budget, sources and sinks.

2   I am not qualified to judge this paper; another global climate budget. Obviously of considerable global importance, and probably a high level of rigour. But surely it is essentially applying the methodology of 2022 to 2023? I see no discussion of improvements in methodology over past budgets, or even comparison with past budgets. What score would I get for tomorrows wetaher forecast?

1   This is (by design) an incremental study revising the budget on a yearly basis.

Unclassified   There are around 75 authors for this document, and from the abstract it says it is a synthesis of previously published datasets and methodologies. Therefore, I'm not sure if it is eligible for REF29? Unfortunately I'm abroad at present so couldn't access the intranet information to check, sorry, so I opted for unclassified.

4   Seems like a very important dataset. However, it is also clearly an update on what was done previously rather than something completely new. 4 awarded mostly on significance.

3+   describe and synthesize data sets and methodology to quantify the five major components of the global carbon budget during 1959-2022 and their uncertainties. These synthesis is critical to better understand the global carbon cycle, support the development of climate policies, and project future climate change.

Unclassified   Review paper (there are a "Global Carbon Budget 2022", "Global Carbon Budget 2021" but the same lead author). This is a an update with incremental changes in methods and outcome

4-   This seems much more extensive than a review so I think it does meet the criteria. The aim to compile and synthesize results annually seems incredibly important but I am not sure how that fits with the scoring criteria - it could be high or low, I've guessed high because of major influence on policy makers and general direction of research.

Unclassified   Synthesis paper using original measurements and data from elsewhere.

3   Rigorous and significant but not particularly original because it largely repeats for a new year what had been done previously.

2   title including 2023 strongly indicates - rigour (and likely incremental influene) not in doubt.

2+   Important for baselines but updating for the latest year so could be seen as incremental?

4   Possibly classed as a review, but a substantial undertaking to bring together and synthesize latest observations and understanding in this critical area and (I think) new analysis is also performed.

U   most difficult one to assess, I hesitated between unclassified and 3. It's importance is indisputable, but the fact it is a minor update from last year makes it less impactful on its own, though its long-term value remains significant.

4+   Very long paper, but highly important work, including not just quantification of carbon budget sources and sinks, but also work to understand uncertainties

4   I found this difficult to score. By definition it is both incremental and a review, but then it clearly has tremendously high impact. I have decided to let the high impact win.

4   This is a synthesis, rather than a review, so I think it is acceptable for ref.

U   Clearly hugely influential, significant and rigorous. However, it is probably essentially the same method with minor, incremental changes on the same papers from 2021, 2022, and so has little originality. Perhaps the originality lies in applying the same technique to a new year, but overall I felt that it warrants a U.

4   Hard to judge this one! Clearly high significance and rigour, but it is an annual summary update so originality is questionable.

4   Is there a danger of this being seen as a review article? From a very quick skim, it seems to generate new information from synthesis of existing results, but probably fine. But something for the more in-depth review to consider.

2   Looks like an important paper but not actually REF friendly. This feels like damning wording from a REF persepctive from the Abstract "This living-data **update** documents changes in methods and data sets" i.e. it's intended as an increment to something coming out annually since 2015. And it's not obvious that there are major changes since the 2022 paper. A dangerous choice?

2   its an update on the previous carbon budget, so would be seen as incremental?

2   Focus seems to be on data and documenting, rather than impacts/significance, which might entail a higher REF score.   Unclassified   Publication of data set

3+   Useful work but presentation very dense and difficult to determine the overall impact of the work

Unclassified   Found this difficult. Had to look up REF definition of research to decide if this would count research: "process of investigation leading to new insights". I decided the paper did present new insights (updated C budget) but then read in the methods section 'The effort presented here is thus mainly one of synthesis' and therefore I decided in the end it was not research and scored 'U'

U   I cannot imagine how a REF panel would view such an article

2+   This is a tough one to rate and I suggest it would be risky to include in our submission. It is a highly valuable series of papers, but this particular edition seems to be very largely incremental with no major new conclusions. The absence of novelty or originality, although it scores highly for rigour, makes me plump for a low score. Significance is hard to judge, but I think this is low given the small delta over the previous years version

3+   Rigorous paper of global significance but not sure how to rate it, given the annual nature of the contribution.

4   Paper is of clear global relevance and presented as the definitive budget.

4   Tricky one. Not novel in terms of science, but very rigorous and will have major influence on users, policy makers, etc.

4   Tricky …important and influential, the fact that exercise done annually may result in paper being only incremental compared to previous one. suppose correct way to look at it is that the newest version replaces previous versions.

3   This is hard to judge. No novelty in terms of approaches (this is basically an annually returning exercise), but a huge amount of effort has gone in and the impact on e.g. policy makers is very large

4   Unsure if this paper classes as a review or it is a metadata analysis. In the end went for the latter as lots of original analysis of the data collated.

3   Hard to score, by design this paper is incremental and methods not novel, but its policy relevance and impact on wider society is huge

Outputs

Log on to CentAUR
Click "ROSS Report"
Click "ROSS Selections"

Don't forget PRO:
Prepublication Review of
research Outputs. Purpose is
to improve our papers from the
perspective of REF. 1 or 2
papers/year (see Danny's email from
28/2/24)

From:	ResearchDeansOffice
Sent:	23 July 2024 16:36
To:	grp.exo.rds.staff
Cc:	Adrian Bell; John Gibbs; Wanda Tejada
Subject:	Quality Assessment of outputs – REF Tool

Sent on behalf of Wanda Tejada

Dear colleagues,

As you may be aware, we have been working over the past year to develop and implement a new system for quality assessment of outputs. The new REF Tool is now being implemented by UOA Leads across the different UOAs, and replaces ROSS.

Overview of the REF Tool and guidance is available here. **We ask that you review the REF Tool Guidance for Researchers**. Key points to note are:

- **Only REF candidate outputs** are expected to be assessed for quality in the REF Tool
- Outputs are **assessed at UOA level** (not division) and the process is led and **managed by the UOA Lead** (not RDLs)
- **Selection** of outputs for assessment **is primarily done by you** (researchers) and guidance on how to do this is available in the Guidance for Researchers
- UOA Leads will be able to add outputs to the pool for assessment if they consider these to be REF candidates and they have not been selected by any of its authors.
- Final scores are informed by **a minimum of two assessments**
- Scores will be provided to **all authors** of the assessed output in the UOA
- Scores **will** be used to **inform REF selections** and **will not** be used to **inform other processes**. Should this change in the future, changes will not be retrospective.

If you have any questions, please contact your UOA Lead in the first instance. Your RDL may also be able to provide some support.
For technical questions, please contact researchintelligence@reading.ac.uk. For general policy questions please contact w.tejada@reading.ac.uk

Adrian Bell & John Gibbs
Outputs Workpackage leads