



1 **This bookmark gauges the depths of the human:**
2 **how poetry can help to personalise climate change**

3
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7
8 **Abstract**

9
10 By conducting a qualitative content analysis of 72 poems written about climate change by
11 poets from across the world, this study demonstrates how these poets have interpreted the, at
12 times, esoteric principles of climate change. The results of this study indicate that these
13 interpretations highlight the need to re-position humans in the epicentre of the debate so that
14 a meaningful dialogue around the subject might be established, especially amongst non-
15 specialists.

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19

20 1. Introduction

21

22 For each of the last three decades, temperatures at the Earth's surface have been rising,
23 reaching levels higher than any recorded since the middle of the nineteenth century, when
24 multiple independently produced measurements first began (Stocker et al., 2013). This recent
25 warming has been caused by an anthropogenic increase in the atmospheric concentrations of
26 carbon dioxide, methane, and other greenhouse gases, which have increased to levels
27 unprecedented in the last 800,000 years (Seinfeld and Pandis, 2016). Carbon dioxide
28 concentrations alone have increased by 40% since pre-industrial times, primarily from fossil
29 fuel emissions and secondarily from emissions caused by changes in land use (Leung et al.,
30 2014). Understanding and quantifying greenhouse gas emissions is central to international
31 efforts to slow their growth rate in the atmosphere, in order to mitigate the humanitarian and
32 economic impacts of global warming.

33

34 The effects of increased greenhouse gas emissions are not just limited to an increase in global
35 temperatures; they are also profoundly influencing our climate, resulting in an increase in the
36 number of heatwaves, extreme weather events and flood risk (Van Aalst, 2006). However,
37 the implications of climate change on our environment and society is not solely dependent on
38 how the Earth system responds to changes in greenhouse gases; instead it depends on the
39 extent to which humankind responds through changes in their lifestyle, attitude, and policy
40 (Moss et al., 2010). Therefore, alongside the work of scientific research that aims to quantify
41 these emissions (see e.g. Palmer et al., 2018), it is necessary for non-scientists to support and
42 develop appropriate mitigation strategies against global warming. In order for this to be done
43 effectively, they need to be both aware that it is taking place, and to be certain that it is
44 anthropogenic (Hassol, 2008). They also need to realise that no matter where they are in the
45 world they are at risk from the effects of climate change (Dominelli, 2011).

46

47 Howe et al. (2015) conducted a study amongst US citizens to determine the extent to which
48 they believed global warming was happening, and how they believed it affected them. They
49 found that of the 12,061 people surveyed between 2008 and 2013, 70% believed global
50 warming to be happening, while only 53% believed it to be anthropogenic. Similarly, only
51 49% of them considered scientists to agree on the anthropogenic nature of global warming; in
52 reality that consensus is at least 97% (Cook et al., 2016). Amongst these same participants, a
53 slim majority (51%) believed that global warming was already harming people in the US, yet
54 only 40% thought that global warming would harm them personally, with 33% of
55 respondents stating that they discussed global warming at least occasionally with friends and
56 family. These results would therefore suggest that while many US citizens still need
57 convincing about the anthropogenic nature of global warming, a more pressing concern is
58 perhaps the need to convince them of the risk that it poses at the individual and local level.

59

60 It is perhaps unfair to single out US citizens for such analysis. Between 2008 and 2009,
61 Gallup (the global performance-management consulting company) conducted a major



62 worldwide poll across 127 countries about personal attitudes towards climate change (Gallup
63 and Newport, 2010). While this is an older data set, the results are in-line with the work of
64 Howe et al. (2015): 63% of people surveyed claimed to know something about climate
65 change, with only 55% agreeing that it was anthropogenic and 47% acknowledging that it
66 posed a serious personal threat. While many climate change communication efforts focus on
67 convincing citizens of the anthropogenic nature of climate change (see e.g. Nerlich et al.,
68 2010), more work is clearly needed to help address the perceived disconnect between global
69 effects and personal threat. What is needed is something that can transcend cultural barriers,
70 and which can contextualise and personalise a global problem. What is needed is poetry.

71

72 In his treatise *A Defence of Poetry*, the English Romantic poet P.B. Shelley (1890, pp. 46)
73 wrote that:

74

75 Poets are the hierophants of an unapprehended inspiration; the mirrors of the gigantic
76 shadows which futurity casts upon the present; the words which express what they
77 understand not.

78

79 A hierophant is considered to be a person who interprets sacred mysteries or esoteric
80 principles. Is there a mystery more sacred than how best to safeguard our planet? Is there a
81 principle more esoteric than the effective mitigation of climate change? In Ancient Greece,
82 hierophants were needed to interpret the will and needs of the gods for the rest of society; at
83 the behest of Shelley might we now turn to poets to interpret the will and needs of our planet?
84 Talking about climate change is difficult. Even experts find it challenging to establish a
85 common language that communicates their research, statistics, and emotions effectively (see
86 e.g. Hulme, 2009). Poetry offers a way to establish this common language, presenting an
87 opportunity for people to express themselves in a different way, to find a fitting language that
88 enables them to talk about climate change in a manner that is personal to them, and which
89 can potentially help them to find the words that are needed to communicate with others more
90 effectively (see e.g. Illingworth and Jack, 2018 and references therein).

91

92 By conducting a detailed qualitative content analysis for a selection of climate change poetry,
93 this study aims to understand how poets have interpreted the principles of climate change,
94 and how these interpretations might be used to engender the dialogue that is needed to
95 meaningfully address the issue. In Section 2, I discuss the methodology that I adopted in this
96 study, and in doing so outline a new approach with regards to how poetry might be used as
97 data to reveal insight into a particular topic (in this instance attitudes towards climate
98 change). Section 3 contains a discussion of how the emergent categories and themes relate to
99 the research questions, and Section 4 contains the conclusions, along with future directions
100 for research.

101

102



103 **2. Methodology**

104

105 The methodology that I adopted in this study involved treating poetry as data, allowing for a
106 contextual meaning of the text to be analysed in relation to climate change. While several
107 other methods exist for the analysis of textual data (e.g. ethnography, phenomenology,
108 grounded theory, etc.), I have chosen qualitative content analysis because of its ability to
109 highlight both the context and the content of the chosen text, which for a subjective medium
110 such as poetry is essential. In outlining the methodology that was used in this study I also
111 intend to provide a blueprint for the qualitative content analysis of poetry with respect to
112 other topics of interest. Previous studies have treated poetry as data to explore certain topics
113 but have tended to focus on methods of inquiry (see e.g. Furman, 2004; Hunter, 2002; Shapiro,
114 2004), autoethnography (see e.g. Furman, 2006; Maurino, 2016), or quantitative coding (see
115 e.g. McDermott Jr and Porter, 1989; Hoover et al., 2014). Similarly, while other research has
116 been conducted in relation to climate change and poetry, this has tended to focus on either
117 literary criticism (see e.g. Trexler and Johns-Putra, 2011; Griffiths, 2017) or action research
118 (see e.g. Miller and Brockie, 2015), the former of which typically involves re-reading much
119 older bodies of texts, while the latter introduces recall and interviewer / facilitator bias. By
120 performing a qualitative content analysis on poetry that has been written recently, but not for
121 the sole purpose of research, this study aims to better understand the way in which poets
122 interpret climate change, and how this might be used to better personalise the subject.

123

124 Any approach which utilises a qualitative content analysis should be guided by these seven
125 steps: formulate research questions; select sample to be analysed; define the categories to be
126 applied; outline the coding process; implement the coding process; determine
127 trustworthiness; and analyse the results of the coding process (Hsieh and Shannon, 2005). In
128 defining my methodology, I will outline the first six of these steps here, with the seventh (the
129 analysis) being presented in Section 3.

130

131 **2.1 Formulation of Research Questions**

132

133 As discussed above, the combination of poetry as data and qualitative content analysis as
134 method were chosen so as to better understand the ways in which poets independently
135 interpret the principles of climate change, and in doing so how this might be used to widen
136 the debate around climate change by making it something that people identify more
137 personally with. For the purposes of this study, this was formalised into the following two
138 research questions:

139

140 RQ1: how have poets interpreted the, at times, esoteric principles of climate change?

141 RQ2: how might these interpretations be used to better personalise the debate around
142 climate change so that it is discussed more widely?

143

144

145 **2.2 Selection of Samples to be Analysed**



146

147 In selecting the poetry for this study, I wanted to engage with a body of work that captured a
148 wide range of interpretations, and from a large number of poets. Selecting poetry from only
149 one or several poets would have limited the potential interpretations, while picking poetry
150 which I identified as being about climate change could potentially have introduced an
151 interpretative bias before any content analysis had taken place. As such I needed a collection
152 of poetry that was definitely about climate change, and which was written by more than a
153 handful of poets. At this stage I also decided to rule out any venture that I had personally
154 been involved with (either through the editing, soliciting, or submission of poetry) so as to
155 avoid interviewer / facilitator bias.

156

157 *Magma* is an international magazine of poetry that is published three times a year in Spring,
158 Autumn and Winter, both on paper and as a digital edition. The editorship circulates among
159 the group which runs the magazine, with an occasional guest editor, and the ethos of the
160 publication is a commitment to publish the best in contemporary poetry, from little known
161 poets to more established ones. Each issue has a designated theme, with submissions for each
162 issue released several months before. Issue 72 of *Magma* was entitled ‘The Climate Change
163 Issue’, with the following call for submissions advertised via their website (Magma, 2018):

164

165

166 We’re looking for poems that engage with the theme of climate change in any way,
167 that reflect it, have it as an emotional underlay, or react against it... Send us poems of
168 grief, anger, despair, dystopian angst, scepticism, devil’s advocacy, activism,
169 optimism, humour, joy... Elegies, satire or whatever.

170

171 The openness of the call made it clear to the poets that they were free to interpret the topic of
172 climate change, which made it an ideal data source for this study. In addition to an editorial,
173 book reviews, and extended features ‘The Climate Change Issue’, which was published in
174 Autumn 2018 and edited by Matt Howard, Fiona Moore, and Eileen Pun, featured 72 original
175 pieces of poetry from 57 authors (Howard et al., 2018). The background of the poets was
176 considered, but only after the coding had been done so as to avoid any bias. After reading the
177 biographical information of these poets and conducting a background search, only two of
178 them could be considered to be active scientists, one of whom is a futurist working for a
179 sustainability non-profit organisation, and the other of whom is an environmentalist, who at
180 the time of writing was working on a master degree in Ecology and Environmental Studies.
181 Given that the RQs are focussed on how poets have interpreted climate change for a non-
182 specialist audience, and that both of these writers self-identify as poets, their poetry was not
183 excluded from study, especially since the ideas and themes explored in their poetry did not
184 result in the emerging of any new codes or categories (see Section 2.4). In addition to the
185 inclusion of these two scientist poets, several of the poems in the issue (8 in total) came about
186 from invited discussions between scientists and conservationists from the Cambridge
187 Conservation Initiative. However, the poets themselves could still be considered to be non-
188 specialists who were interpreting climate change following conversations with climate
189 change experts, and so their poetry was included in the analysis.



190

191 While it is not necessarily the case that poetry anthologies will always exist for a particular
192 topic, it is also true that many poems do in fact make the topics of their intent sufficiently
193 clear so as to avoid interpretive bias. However, in order to answer RQ1 for this study it was
194 necessary to pick contemporary poetry written from a wide selection of poets, for which ‘The
195 Climate Change Issue’ presented the ideal source. The following quotation, taken from the
196 editorial, also outlines how the overarching tenet of this issue is fully congruent with the
197 rationale behind this study, i.e. that climate change should not be just the sole preserve or
198 concern of the scientist (Howard et al., 2018, p. 5):

199

200 It seems redundant to say climate change isn’t just a scientific concern when its scope
201 is no less than total – perhaps we are waiting for human consciousness and behaviours
202 to catch up.

203

204

205 **2.3 Definition of Categories to be Applied**

206

207 A conventional approach to qualitative content analysis was adopted in this study, with pre-
208 conceived categories being avoided, and instead being determined by the implementation of
209 the coding process (see Section 2.4). While in some instances a directed content analysis
210 might be more appropriate, this is usually used in those instances where an existing theory
211 would benefit from further description (Hsieh and Shannon, 2005). As the research questions
212 to be addressed in this study are unique, a directed approach is inappropriate. Similarly, a
213 summative content analysis would fail to fully account for the context of the poetry alongside
214 its content.

215

216 **2.4 Outline and Implementation of Coding Process**

217

218 The outline and implementation of the coding process have been combined here, as they are
219 closely interrelated, and discussing them together serves to better highlight how such an
220 approach was adopted in this study.

221

222 A traditional approach to coding data during qualitative content analysis would be to begin
223 by identifying meaning units in the text, condensing these down to smaller units and then
224 labelling these units with codes. These codes would be chosen so as to describe what each
225 meaning unit was about, after which different codes would be grouped into thematic
226 categories according to content and context, before looking for any emerging theme(s) that
227 expressed an underlying meaning of the text and which could be directly related back to the
228 research question(s) (Erlingsson and Brysiewicz, 2017). Whilst this overall schema can be
229 observed in the process outlined below, the approach that I adopted differed slightly in its
230 treatment of condensed meaning units, which should be avoided when treating poetry as data
231 for qualitative content analysis. This is because in addition to overly short meaning units
232 leading to fragmentation (Greeneheim, 2004), poems, unlike transcripts or survey responses,
233 have been crafted by the author so that every word and sentence has ‘meaning’. As such each



234 line (and perhaps each word) of the poem could already be considered to be a meaning unit
235 and should not be condensed further.

236

237 In conducting my analysis, I began by reading all of the poems in ‘The Climate Change
238 Issue’ to familiarise myself with their content and context. I then went through each of the
239 poems in the order in which they appeared in print, and assigned codes to sections of the
240 poems that addressed RQ1 (i.e. how had these poets interpreted climate change). Assigning
241 an overall meaning or tone to the poem as a whole was avoided, as this would introduce a
242 degree of subjectivity that is inappropriate unless a phenomenological approach is being
243 adapted, in which the lived experiences of the researcher(s) is being considered as an
244 essential part of the analysis (see e.g. Illingworth and Jack, 2018). As such an approach is not
245 compatible with the research questions of this study, I instead assigned codes to lines of text
246 which made reference to a specific label. These labels emerged from the poems, and were
247 chosen to be as objective as possible, as can be seen from Table 1.

248

249 As well as avoiding tone and sticking to specific references in the text, coding occurrences
250 were always chosen to be literal rather than metaphorical or symbolic, so that further
251 subjectivity could be avoided. For example, “and gulls strewn like heaps of soiled rags
252 among oil-glistened // bodies of harbor seals after the blowout on Platform A” was coded as
253 ‘Fauna’, whereas “I meet Al Gore // in the lovely woods // of sleep // he’s braver // than a
254 tiger” was not, as in this instance the tiger was being used to symbolise bravery (here, and
255 throughout this manuscript, // is used to indicate a line break in the poem, i.e. the termination
256 of one line of the poem and the beginning of a new one.). These lines were however coded as
257 ‘Humans’ because they made explicit reference to a human being other than the author of the
258 poem, i.e. Al Gore.

259

260 As each new code was realised I went back through the poems that had previously been
261 coded to see if these also contained any lines that could be labelled with this newly emergent
262 code. I then read all of the poems in full again and made sure that each of them had been
263 coded accurately and that a saturation of emergent codes had been reached. This resulted in a
264 total of 21 codes. I then read each of the poems again and made sure that no coding had been
265 missed. Following this I went through each of the individually coded segments and checked
266 to make sure that they really did belong in this category, checking that (for example) Al Gore
267 being described as a brave tiger was coded as ‘Human’ rather than ‘Fauna’. At this stage I
268 realised that one of the codes that I had created was at odds with my methodology, and so it
269 was removed. ‘Personification’ has been defined as ‘any poems that were written as if from
270 the point of view of nature / the Earth system’, and although there were four such instances of
271 this code, I considered this to be too subjective for the analysis, and so it was removed. This
272 resulted in the 20 codes that are outlined alongside their definitions in Table 1.

273

274 After this coding had taken place, I read through all of the coded references and then grouped
275 these into categories, which consisted of codes that appeared to deal with the same issue.
276 Table 2 outlines the categories and corresponding codes, along with the number of times they
277 occurred. These categories, and their relation to the research questions are discussed further



278 in Section 3. After these codes had been grouped as such I went back through each of the
279 individual occurrences (e.g. the 152 segments of poetry that were categorised as ‘Habitat’) to
280 make sure that they did indeed belong in this category. As can be seen from Table 2, this
281 resulted in 5 individual categories: ‘Habitat’, ‘Reactions’, ‘Language’, ‘The Present’, and
282 ‘Our Future’.

283

284 Following this categorisation of the codes, they were further examined for any themes that
285 expressed underlying meaning in relation to the research questions (Erlingsson and
286 Brysiewicz, 2017), the results of which are presented in Section 3.6.

287

288 **2.5 Trustworthiness of Coding**

289

290 In order to improve the trustworthiness of this content analysis, I followed the checklist
291 outlined by Elo et al. (2014), which involved checking for trustworthiness at the preparation,
292 organisation, and reporting phases of the analysis. In the preparation phase, the data
293 collection, sampling strategy, and unit of analysis (unit of meaning) selection were carefully
294 considered and have been justified above. During the organisation phase, the categorisation,
295 interpretation, and representativeness of the analysis was assured by repeatedly checking for
296 consistency, e.g. by checking each of the individual occurrences of text against the
297 categories. The reporting phase is covered in Section 3 of this study, but here trustworthiness
298 was assured by providing enough detail to ensure that the reader can evaluate the
299 transferability of the results.

300

301 In order to establish the trustworthiness of the analysis of poetical data, Shapiro (2004) also
302 recommends establishing an audit trail, ensuring that there has been a theoretical saturation of
303 the data, and where possible involving more than one researcher. While the audit trail and
304 saturation of data have been discussed (with Table 1 and Table 2 demonstrating how the
305 emergent codes and categories in this study were defined and organised), in this instance only
306 one researcher was used to analyse the data, and as such this may introduce biases to the
307 interpretation of the data. However, this is also true for any content analysis that involves
308 only one researcher (Elo et al., 2014). As the goal of this analysis is not to guarantee the
309 systematic development and use of a code book, the interpretive process is not overtly
310 affected by the use of a solo researcher. Furthermore, the transparency of the coding and
311 subsequent analysis further improves the trustworthiness of the approach.

312

313 **3. Results and Discussion**

314

315 As can be seen from Table 2, five major categories emerged from the methodology that was
316 adopted in analysing these poems. I now discuss each of these emergent categories, how they
317 relate to RQ1 (“how have poets interpreted the, at times, esoteric principles of climate
318 change?”), and how they compare to other research that has been conducted in terms of the
319 communication of climate change. Following a discussion of these categories I present the
320 overall theme that emerged from conducting this analysis, and how this relates to both RQ1



321 and RQ2 (“how might these interpretations be used to better personalise the debate around
322 climate change so that it is discussed more widely?”).

323

324 **3.1 Habitat**

325

326 The most prominent category to emerge with regards to the ways in which poets interpreted
327 the principles of climate change was ‘habitat’. This category emerged from a variety of
328 different sources, with many of the poems focussing on a celebration of habitat (either the
329 flora or the fauna or both) as is evident from the snippets of the following two poems: ‘A
330 Trip to Mount General in Late Winter’ by Huang Fan and translated from Chinese into
331 English by Lei Yanni (Howard et al., 2018, p. 13):

332

333 In the bamboo grove where you can almost
334 forget who you are – if you are steadfast as the plum blossoms
335 that hold on to early spring

336

337 And ‘Beijing Parakeets’ by David Tait (Howard et al., 2018, p. 11)

338

339 but I wait beneath the bare pomegranate tree
340 and watch the two old parakeets, lovebirds,
341 huddled up together, one cleaning the feathers
342 on the other’s head, the other softly singing.

343

344 Both of these poems celebrate habitat, but they also ground this celebration in how habitats
345 (and nature) are experienced and appreciated by humans, as is also evident from this extract
346 from ‘Notes from a transect’ by Polly Atkin (Howard et al., 2018, p. 47)

347

348 One school wins a visit from the scientist. When she asks
349 *does anyone have wildlife stories to share?*
350 the whole school put up their hands.

351

352 In contrast to this celebration of current habitats, and how they are appreciated, several of the
353 poems also considered the loss of habitat. The following two extracts from ‘An eco-worrier
354 tweets’ by Neetha Kunaratnam (Howard et al., 2018, p. 41) and ‘ISOTHERM’ by Jos Smith
355 (Howard et al., 2018, p. 54), demonstrate how this loss was explored by the poets for both
356 flora and fauna, respectively:

357

358 while we pine for the pines,
359 and they plane the mighty planes

360

361 And:

362

363 What does a loss of birds look like?

364



365 What is the collective noun
366 for such losses? Would you hear
367 the silence of lapwings, of thrushes?
368

369 As with the celebration of habitat, what is particularly interesting with regards to how the
370 poets chose to represent this loss, was that it was almost always contextualised with respect
371 to humans, i.e. “*we* pine for the pines” and “Would *you* hear the silence of lapwings”
372 (emphasis in italics is my own). While the following extract from ‘Notes from a transect’ by
373 Polly Atkin (Howard et al., 2018, p. 48) makes clear that this habitat loss should not be
374 ranked, it is clear that any quantification / rationalisation of loss is seen by the poets to be
375 reliant on human consideration:
376

377 Is it cheaper to weep for a sea otter – clutching
378 paws in the water – than a lake?
379

380 Exploring this idea of loss further, it is the relationship between humans and habitat, and in
381 particular how conflict has arisen to become the dominant connection between the two, that
382 many of these poems aspire to, as is evident from this extract from ‘The loss of birds’ by Nan
383 Craig (Howard et al., 2018, p. 64):
384

385 They were everywhere, I insist. *Everywhere*.
386 You smile politely and begin to drift away.
387 WAIT! I shout. They also *sang*!
388

389 This need for human contextualisation might be seen to be an unconscious (or conscious)
390 reflection by the poets on the role that humans are playing on impacting the climate, and the
391 fact that we are the only species that are able / willing / conscious of making such an impact.
392 This concept is further evident in Matthew Griffiths’ ‘Pantones for the Anthropocene’, the
393 very title of which makes reference to the current geological epoch, viewed as the period
394 during which human activity has become the dominant influence on climate and the
395 environment (Howard et al., 2018, p. 35):
396

397 This bookmark gauges the depths of the human,
398 Laid to the layers to show where a new one
399 Rises like icing, a fresh fall of snow on
400 A stiffening stratum, and so – with the golden
401 Spike on the graphlines not otherwise seen –
402

403 Habitat loss, and in particular extinction risk, has long been presented by scientists as one of
404 the most visible effects of climate change, with e.g. Thomas et al. (2004) stating that a large
405 fraction of species could be driven to extinction by expected climate trends over the next 50
406 years. As such, it is perhaps not surprising that many of the poets chose to explore the role of
407 habitat and climate change, and in doing so further examine the evolving relationship
408 between humans and nature. What these poems make evident however, is that despite our



409 behaviours (and the original code that was adopted in Table 1) it is impossible to view
410 ‘humans’ and ‘nature’ as two mutually exclusive entities, as although anthropogenic climate
411 change may be having a hugely negative effect on nature the two systems are clearly
412 interrelated, or as noted by Corlett (2015, p. 4):

413

414 If humans are now the dominant ecological force on the planet, then it is impossible
415 to separate ‘humans’ and ‘nature’ in the way that conservation has traditionally tried
416 to do.

417

418 **3.2 Reactions**

419

420 This category represents those poems that explore the reactions that humans have towards
421 climate change, the largest proportion of which represent an acknowledgment that climate
422 change is happening and also that humans are largely to blame for its cause and effects, either
423 because of very specific incidents, as evidenced in this extract from ‘Río Nuevo’ by Leo Boix
424 (Howard et al., 2018, p. 75):

425

426 New owners didn’t rotate their crops.
427 A Martian landscape rapidly arose.

428

429 Or because of more general attitudes and behaviours, as expressed by Patrick Sylvain in
430 ‘Ego’ (Howard et al., 2018, p. 26):

431

432 In the boundless universe,
433 I am less than a speck.
434 But my ego,
435 The size of a planet,
436 Defames the world.

437

438 The outcomes of these attitudes are also examined by the poets, with Matthew Griffiths, in
439 his poem ‘Pantones for the Anthropocene’, exploring the notion that burying our heads in the
440 sand has simply served to further distance ourselves from both the problem and also nature
441 more generally, (Howard et al., 2018, p.35):

442

443 Lifting our arses up in the confusion
444 Of air and ourselves we have made of the future
445 And off the hot core of that gobstopper, nature.

446

447 Alongside this general acknowledgment that climate change is anthropogenic, there is also
448 some doubt. However, this reaction does not manifest itself in terms of climate change denial,
449 but rather in terms of the degree to which we can truly quantify its extent, as demonstrated by
450 Penelope Shuttle in ‘An Inconvenient Truth’ (Howard et al., 2018, p. 65) :

451

452 no one knows where the past goes



453 no one knows anything about
454 anything on this dirty little planet
455 of ours

456

457 This doubt and uncertainty is accompanied by a realisation that climate change is not a
458 simple problem, either in conception or communication, as Polly Atkin observes in ‘Notes
459 from a transect’ (Howard et al., 2018, p. 46):

460

461 in the data the scientist says it’s hard
462 to ask questions to prise apart correlation
463 habitat or climate disturbed or not
464 disturbed perception or preconception
465 it depends what scale you concern yourself with

466

467 An interesting issue that arises in these poems is that despite an acknowledgment and
468 ownership of the problem, very few solutions for mitigating against or even adapting to
469 climate change are presented. In ‘A way of managing diversity’ Kathryn Maris tells us that
470 “We must band together against this encroaching threat” (Howard et al., 2018, p. 58), while
471 in ‘Do not turn this page !!!’ Roger Bloor states “then what is the answer? // 0 level carbon
472 emission target” (Howard et al., 2018, p. 98). However, despite a lack of actual solutions
473 several of the poets still express hopes for the future, with Joanna Guthrie observing in ‘Here,
474 afterwards’ that (Howard et al., 2018, p. 12):

475

476

477 at which you will look down
478 from time to time
479 amazed at the journey
480 their new strength
481 the way that they’ve
482 adapted best of all
483 to this time

484

485 In considering the reactions that humans take towards climate change, these poems have
486 interpreted climate change as something that does exist, and that we (as humans) are largely
487 to blame for, but there is a distinct lack of any real, or even perceived, solutions to the
488 problem. There is hope, but less certainty in what this will actually look like / how it will
489 physically manifest itself. There is also an acceptance that things are not simple, and that in
490 interpreting these results and trying to make sense of them, scientists have a difficult job that
491 is made more so by trying to represent error bars and standard deviations as something that
492 still possesses an urgency. Such an attitude is reflective of recent research that has revealed
493 that the language used by the global climate change watchdog, the Intergovernmental Panel
494 on Climate Change (IPCC), is overly conservative (Herrando-Pérez et al., 2019).

495



496 Previous studies (see e.g. Budescu et al., 2009) have shown that there is a large disconnect in
497 the ways that scientists and non-scientists understand uncertainty, and that as such the
498 communication of uncertainty has the potential to undermine effective action unless climate
499 change messages are framed appropriately (Morton et al., 2011). However, these poems
500 would seem to suggest that the poets take into consideration the nuances of quantifying
501 climate change. These poems also clearly demonstrate that there is an acknowledgment of the
502 anthropogenic nature of climate change, but that a likely barrier to engagement is a perceived
503 lack of potential solutions, as has also been discussed by e.g. Lorenzoni et al. (2007).

504

505 3.3 Language

506

507 Another category to emerge from this content analysis was the importance of language. Many
508 of the poems adopted language that could be considered to be spiritual or quasi-religious; for
509 example, Ben Smith in the poem ‘Data Sets’ observes that (Howard et al., 2018, p. 18):

510

511 This is the real work of divination:

512 not grand prophecies

513 but data gathering.

514

515 While ‘Data Sets’ uses quasi-religious language as a comparison for the underlying science
516 of understanding climate change, several other poems encompass this form of language as a
517 direct invocation for protection and/or help from a higher power, as is evident in these lines
518 from Sarah Gridley’s ‘Diabolic Clouds Over Everything’ (Howard et al., 2018, p. 97): “For
519 the love of God, // or otherwise”, and also these from Leo Boix’s ‘Villanelle (Un Paisaje)’
520 (Howard et al., 2018, p. 9): “An altar to pray for a better world”.

521

522 In contrast to this use of spiritual language, other poems use a form of language that could be
523 classified as scientific, i.e. they make reference to a specific fact or piece of technical jargon,
524 such as the line ‘Light breeze is the first sign of barometric change’ in Rachel Mead’s poem
525 ‘A Beaufort Scale for Depression’ (Howard et al., 2018, p. 28) or “Say hello to the Man Age,
526 so long to the Holocene” in Matthew Griffiths’ ‘Pantones for the Anthropocene’ (Howard et
527 al., 2018, p. 35), where the poet explains the title of the poem by making reference to another
528 geographical period, and drawing attention to the notion that the Anthropocene is a
529 functionally different epoch from that of the Holocene (see e.g. Waters et al., 2016). By using
530 scientific language in this way, the poets are introducing their readers to new research and
531 findings albeit in a markedly different style to that used in scientific research or even popular
532 science articles.

533

534 One of the most stylistically interesting poems in the collection is Cat Campbell’s ‘CH₄ is a
535 much more potent greenhouse gas than CO₂’, which takes the work done by Worrall et al.
536 (2010) on ‘Peatlands and climate change’, and interspaces the scientific findings of this
537 report with lines of poetic text (represented in italics), the effect of which is to introduce the
538 reader to scientific fact (both that of the title and the notion that peatlands can be a source as
539 well as a sink of carbon) whilst simultaneously humanising it (Howard et al., 2018, p. 15):



540
541 It is possible for a peatland,
542 *site of battles and back-breaking crofting,*
543 to be a net sink for carbon,
544 *blood, sweat, grief and hate,*
545 but at the same time
546 *to be a source of enough tranquillity*
547 to have a net positive
548 *effect on human nature and a*
549 radiative forcing (i.e., warming)

550
551 As well as turning to the languages of science and religion in an attempt to convey their
552 message, several of the poems also made use of languages other than English. The poems in
553 this collection included only one complete translation, ‘暮冬时节将军山行’ by Huang Fan
554 that was translated from Chinese into English as ‘A Trip to Mount General in Late Winter’
555 by Lei Yanni. The other poems that used a language other than English interspersed the text
556 with words from that language, such as the use of Spanish by Leo Boix in Villanelle (Un
557 Paisaje) or ‘Stotterin into Anthropocene’ by Christine De Luca, which was written entirely
558 in the Shetlandic dialect, with the reader not presented with a translation, but rather a glossary
559 of terms (for example, that the word ‘glunsh’ means to ‘swallow greedily’). What was
560 particularly interesting about these poems was that the author had clearly chosen to write
561 sections of the poem in a language other than English as it enabled them to more fully
562 express what it was that they meant to say about climate change.

563
564 In considering the emergent category of language across these poems, it is evident that using
565 only a singular official language (i.e. English) or technical language (i.e. science) is not
566 sufficient to interpret and communicate the causes and consequences of climate change, and
567 that by doing so we are at risk of ostracising those communities that are not fluent in these
568 chosen languages. English-speaking status has been shown to be a limiting factor in
569 participating in the IPCC (Ho-Lem et al., 2011), whilst many studies often omit non-English
570 research when conducting large-scale research into barriers to climate change adaptation (see
571 e.g. Biesbroek et al., 2013). These poems suggest that by restricting the *lingua franca* of
572 climate change to scientific English, it is perhaps not surprising that it is discussed less
573 widely than is needed for meaningful action to take place.

574 575 **3.4 The Present**

576
577 This category considers those poems that make reference to the current state of the climate
578 change system, outside of those already emergent in the category of habitat discussed in
579 Section 3.1. Poems that were categorised as such included those that discussed the weather as
580 an interrelated aspect of the climate system, either through a specific example, as
581 demonstrated in this extract from ‘Change’ by D A Prince (Howard et al., 2018, p. 29):
582



583 But these fields are,
584 again, under water, brought
585 to the brink of drowning
586

587 Or else through the notion that something is ‘not quite right’, and that one of the ways that
588 this can be observed is through changes in the weather, as is apparent in ‘This Weather’ by
589 Siún Carden (Howard et al., 2018, p. 29):

590
591 she finds it swirling there, and she can’t say
592 she’s been herself, this weather.
593

594 In addition to the current state of the weather, this category also considered those poems that
595 made reference to the current state of pollution. The majority of poems that made reference to
596 this topic were concerned with plastics in the oceans, such as this extract from ‘There is No
597 Alternative’ by Momtaza Mehri (Howard et al., 2018, p. 56):

598
599 the future belongs to the yolky bopping heads of plastic ducks
600 green bottle caps cigarette butts everything touched by the lips
601 then cast unuttered into oceans into the pooled memory cells of the universe
602

603 There was only one mention of air pollution in any of the poems, occurring in ‘Beijing
604 Parakeets’ by David Tait: “I’ve already got a pollution headache ... the smog of Beijing
605 simmering around us.” (Howard et al., 2018, p. 11) The relative popularity of plastic
606 pollution in these poems is likely symptomatic of the increase in public attention that this
607 issue has received following the BBC TV series *Blue Planet II* and the subsequent media
608 outcry (see e.g. Kenward, 2018). In future years, such a collection of poetry might would
609 likely contain more poems on other environmental topics that had risen amongst the public
610 consciousness.

611
612 Across all of the poems, only two of them made reference to an actual historical event and in
613 both instances, these referred to storms. In ‘Howling Wind’, Patrick Sylvain observes how
614 “Hurricane Matthew broke spines already fractured” (Howard et al., 2018, p. 26), while in
615 ‘Tip #5 What not to say whilst online dating’, Helen Moore recalls a recent storm in Bristol,
616 remarking that (Howard et al., 2018, p. 60):

617
618 Beaufort 9 bludgeoning Bristol, pounding the city
619
620 like WWII was recurring. On the Harbourside,
621
622 gales chucking slops at houseboats, yachts,
623 clinking masts like Chinese businessmen gan bei-ing a deal
624

625 It should be noted that while one of these poems recalls a well-known global event
626 (Hurricane Matthew was the storm that caused catastrophic damage and a humanitarian crisis



627 in Haiti in the Autumn of 2016) and localises it to the frame of reference of the reader, the
628 other makes reference to a localised storm and contextualises it with reference to a global
629 event (WWII), thereby highlighting the ability of the poet to interpret and frame the
630 principles and effects of climate change in order to communicate to the reader.

631

632 The poems in this category also consider the general effects of climate change in terms of
633 things being either broken or killed, not in terms of specific fauna or flora (see Section 3.1)
634 but rather a general sense of death and destruction, as evidenced by the following line from
635 ‘Beaufort Scale for Depression’ by Rachel Mead (Howard et al., 2018, p. 28): “Widespread
636 structural damage. Zero visibility. This is the point of collapse, the black hole.”

637

638 This category highlights the ‘messy’, interrelated nature of climate change, and demonstrates
639 that poets are not afraid to discuss several different systems (climate change, weather,
640 pollution, etc.) in order to communicate to their audience. While scientists are often at pains
641 to point out the differences between weather and climate, and the confusion that such a
642 misunderstanding can entail (see e.g. Weber and Stern, 2011), it is also true that beliefs in
643 climate change are affected by local weather conditions (Li et al., 2011). By presenting
644 changes in both the weather and climate alongside one another, the poets are aiming to reach
645 out to their audience and ground them in a language that they understand rather than to
646 confuse them or cut off from a particular line of enquiry. By not allowing such interrelated
647 discussions to take place (confusing as the may sometimes be), there is also the argument that
648 a non-scientific audience is being denied access to solutions from an interrelated field. One
649 such example is the success of the Montreal Protocol in tackling the Ozone Layer (Oberthür,
650 2001), as while it has been shown that a non-scientific audience often confuses stratospheric
651 ozone depletion with the greenhouse effect (Bostrom et al., 1994), presenting the Montreal
652 Protocol as an exemplar of how government policy can engender positive environmental
653 change on a global scale, can help to present some of the potential solutions to the climate
654 change issue that these poems have highlighted as being less than readily available (see
655 Section 3.2), thereby overcoming one of the potential barriers to dialogue.

656

657 3.5 Our Future

658

659 In contrast to the previous category, this final category is one that emerged as a result of
660 poems that discuss possible futures that might arise as a result of the current climate system.
661 There is a large range of temporal scale in these poems, with some imagining the fallout of a
662 climate catastrophe in a not-too-distant future, such as that presented in this extract from
663 ‘There Is No Alternative’ by Momtaza Mehri (Howard et al., 2018, p. 56)

664

665 The Alliance of Small Island States were the earliest to disappear
666 the shepherds were the last the gospel preachers of accumulation had nowhere to go
667 they were too busy competing with the skies to notice them folding in

668

669 Whilst others are grounded in a future quite markedly different from our current state, such as
670 ‘Theft-saving’ by Amaan Hyder, who imagines a future where (Howard et al., 2018, p. 63):



671
672 You fly a distance of twenty planets
673 to a zoo to see your first animals,
674
675 pure as the night their ancestors were taken,
676 beamed up out of extinction.
677
678 And others much further still, with ‘I was human once’ by Ama Bolton considering the Earth
679 system many years from now when there are no humans left at all (Howard et al., 2018, p. 8),
680 and where:
681
682 through centuries of firestorm
683 when things cool down I’ll know it’s time
684 to spin the whole unholy yarn
685 all over again
686
687 Whilst these poems create the framework for a future Earth based on a variety of different
688 scenarios, other poems also reflect on the ‘consideration of the future’ itself, and how useful
689 (or not) this might be in combatting climate change. This extract from Sarah Gridley’s
690 ‘Diabolical Clouds Over Everything’ being a particularly powerful rallying call against the
691 inaction that can sometimes arise from over-pontification (Howard et al., 2018, p. 97):
692
693 No one will draw in the future. Soon
694 we will stop having to ask,
695
696 What must the future hold?
697
698 Aside from discussions of imagined futures for the Earth system and humans in general, the
699 poems in this category also make specific reference to children and their relationship with
700 both ourselves and nature. Some of these poems focus on what we choose and have chosen to
701 leave behind as an inheritance, such as in ‘Estate’ by Steve Kendall (Howard et al., 2018, p.
702 96):
703
704 To our children
705 we bequeath the promises we made, their rightful solitude
706
707 Other poems consider the responsibilities that we have for our children’s current and future
708 wellbeing, as evident by the line “I would like my children to feel safe” in Kathryn Maris’ ‘A
709 way of managing diversity’ (Howard et al., 2018, p. 58). By asking the reader to consider the
710 future implications of climate change on future generations these poems support the narrative
711 that many members of the public consider providing a better life for future generations to be
712 the most important motivator in taking action against climate change (see e.g. Leiserowitz et
713 al., 2009). As noted by Pahl et al. (2014), in order for people to acknowledge the future
714 implications of their current lifestyles and community choices, it is first necessary to improve



715 how we engage them in envisioning the future, and as is demonstrated here poetry provides
716 one potential way for providing this engagement.

717

718 **3.6 An Emerging Theme**

719

720 In considering these categories in the context of RQ1 (“how have poets interpreted the, at
721 times, esoteric principles of climate change?”), a clear theme emerges: the central role that is
722 occupied by humankind. This role concerns how we as humans have accepted our past, how
723 we are moulding our future, the extent to which we are defending and destroying our shared
724 habitat with nature, and how we determine both the language of communication and
725 appropriate reactions.

726

727 This positioning of humans in the epicentre of the climate change debate might at first be
728 seen to be somewhat egotistical or even narcissistic. Just as the famous philosophical thought
729 experiment asks ‘if a tree falls in a forest and no one is around to hear it, does it make a
730 sound?’ to some extent these poems ask us to consider ‘if the climate is changed but no one is
731 around to measure it, does it actually change?’ There is an arrogance here, but in addressing
732 RQ2 (“What does this tell us about how scientists can talk about climate change to non-
733 specialist audiences?”) it is a necessary one, i.e. that in order to establish the dialogues that
734 are needed to enact change it is vital to remind audiences of the central role that humans *do*
735 occupy in terms of both cause and effect. Without this re-positioning, there is a danger that
736 climate change will be assumed to be beyond the control and responsibility of humankind;
737 yet, as noted by Urry (2015, p. 46) it is vital to remember that climate change “is not a purely
738 ‘scientific’ problem and that human actions are central to this apparent warming of the
739 planet.” Similarly, without such re-positioning the phrase ‘climate change’ itself risks being
740 interpreted as a phenomenon that is passively happening, rather than something that we, as
741 humans, are both causing, and are thus ultimately responsible for mitigating.

742

743 Whilst studies such as those conducted by O'Neill and Nicholson-Cole (2009) have shown
744 that fear is generally an ineffective tool for motivating genuine personal engagement, failing
745 to remind people of the role that humans have played in causing climate change, and the role
746 that they must now assume in mitigating against it, is arguably equally ineffective in
747 establishing the dialogue that is first needed before meaningful action can take place. In the
748 foreword to the poem ‘Sample Basket Red List 2318’, Jen Hadfield writes that (Howard et
749 al., 2018, p. 68):

750

751 To approach the global crisis we need to attend to the local crisis. Isn't approaching
752 the global crisis by addressing local specificity one of the things poetry is best at?

753

754 By acting as modern-day hierophants, this study argues that poets can highlight to scientists
755 and communication experts the challenges to engendering individual and collective action on
756 the topic of climate change. These findings manifest themselves in a need to re-position
757 humans at the centre of the climate change debate, and in so doing to consider the use of a
758 language that is localised and personal, to help broaden the conversation to every human.



760 **4. Conclusions**

761

762 By acknowledging that there is a lack of dialogue around climate change amongst a non-
763 specialist audience, this study set out to ask “how have poets interpreted the, at times,
764 esoteric principles of climate change?” (RQ1) and in doing so to determine “how might these
765 interpretations be used to better personalise the debate around climate change so that it is
766 discussed more widely?” (RQ2). By conducting a detailed qualitative content analysis on a
767 selection of climate change poetry, a number of categories emerged with regards to the poets’
768 interpretation of the topic, with ‘Habitat’, ‘Reactions’, ‘Language,’ ‘The Present’, and ‘Our
769 Future’ all being underpinned by an emergent theme of the need to re-centre climate change
770 around humankind.

771

772 In considering future communications around climate change, this study recommends that the
773 role of humankind in causing and potentially mitigating climate change is made explicit, and
774 that in doing so scientists and communication experts consider carefully the language that is
775 being used. In particular, it is vital to determine if a monopoly of English and/or technical
776 scientific language is at risk of de-personalising the topic, thereby making it less likely to be
777 discussed.

778

779 This study has also outlined how poems might be used as a form of data to provide further
780 insight into the interpretation of scientific topics by non-specialists, and how such
781 interpretations might lead to recommendations to establishing a dialogue with such an
782 audience. The main limitations of this method are via the potential for bias in either the
783 selection of the poetry or in the coding and subsequent analysis. However, by selecting a
784 broad range of independent poetry (as was done here) and taking care to outline the
785 transparency of such an approach (for example by carefully describing the relationship
786 between emergent codes, categories, and themes), the trustworthiness of this method can be
787 established. In order to further explore the importance of language a future study that
788 investigated the interpretation of poetry written in multiple languages and dialects would be
789 conducive; however, such an interpretation would be reliant on a multilingual research team
790 and/or translation of the poems that had been sanctioned by the poet.

791

792 At the beginning of the poem ‘Tip #5 What not to say whilst online dating’ Helen Moore
793 quotes the American poet political activist Grace Paley (Howard et al., 2018, p. 60):

794

795 It is the responsibility of the poet to be a woman to keep an eye on this world and cry
796 out like Cassandra, but be listened to this time.

797

798 In Greek mythology, Cassandra was the daughter of Priam and Hecuba and was cursed to
799 utter prophecies that were true but that no one believed. Clearly this responsibility should not
800 just lie with the poet, but in interpreting climate change for a non-specialist audience, the
801 poets that featured in this study have demonstrated the importance of re-positioning humans
802 at the very centre of the topic.



803 **Data Availability**

804

805 The poems that were selected for the analysis, along with their coded categories, are
806 available through (Illingworth, 2019; DOI: [10.17605/OSF.IO/T2YDR](https://doi.org/10.17605/OSF.IO/T2YDR))

807

808 **Competing interests**

809

810 Author SI is the chief executive editor of *Geoscience Communication*.

811

812



813

814 **References**

815

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 926
 927

928 *Table 1: the codes that emerged from the content analysis. *The number of occurrences is*
 929 *not limited to one per poem.*

Code	Description	Occurrences*
Fauna	Makes specific reference to mammals (other than humans), insects, birds, fish, etc.	61
Flora	Make specific reference to plants, trees, etc.	32
Mutually Exclusive	Makes specific reference to humans and nature being unable to live together in harmony.	31
Science	Makes specific reference to a specific scientific fact or piece of scientific information.	31
Acknowledgment	Makes specific reference to acknowledging that there is something wrong with the current climate system.	30
Humans	Makes specific reference to humans, not as the narrator of the poem but rather as objects that feature in it.	28
Weather	Makes specific reference to the weather.	26
Blame	Specifically attribute blame to someone / something for the current state of the climate system.	22
Death	Makes specific reference to death.	19
Spiritual	Makes specific reference to a spiritual or religious concept.	19
Children	Makes specific reference to children.	16



Other Language	Used another language (other than English) to communicate what they wished to express.	14
Pollution	Makes specific reference to pollution.	11
Hope	Makes specific reference to hope that is either present in or may arise from the current state of the climate system.	10
Future	Makes specific reference to the future.	9
Looking Away	Makes specific reference to humans looking away or being agnostic in our attitudes towards the current climate system.	9
Broken	Makes specific reference to things being broken.	7
Doubt	Makes specific reference to doubting the existence and impacts of negative anthropogenic climate change.	6
Solutions	Makes specific reference to a potential solution to the negative effects of climate change.	4
Specific Event	Makes reference to a specific event brought about / affected by climate change.	2

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931 *Table 2: the categories that emerged, alongside their corresponding codes. *The number of*
 932 *occurrences is not limited to one per poem.*

Category	Corresponding Codes	Occurrences*
Habitat	Fauna, Flora, Mutually Exclusive, Humans	152
Reactions	Acknowledgment, Blame, Hope, Looking Away, Doubt, Solutions	81
Language	Science, Spiritual, Other Language	65
The Present	Weather, Death, Pollution, Broken, Specific Event	65
Our Future	Children, Future	25

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