POPE FRANCIS'S *LAUDATO SI'*
A corpus study of environmental and religious discourse[1]

ERIK CASTELLO, SARA GESUATO
UNIVERSITÀ DEGLI STUDI DI PADOVA

Abstract – This paper explores aspects of the lexico-grammar of religiously oriented environmental discourse produced by a leading religious authority, Pope Francis. It examines the most frequent keywords and keyword clusters of the encyclical letter *Laudato Si'* against popularised updates on scientific and technological advances available on the NASA website. The findings show that *Laudato Si'* draws attention both to how people's behaviour affects the environment and to its relevance to the current political and economic situation. The Letter also calls for a much-needed caring attitude towards the environment, and thus appears to be characterized by the directive communicative function throughout, while presenting a more specific religious slant only in select chapters. The analysis carried out highlights both the topics and the rhetorical goals of the discourse of Pope Francis.

Keywords: environmental discourse; religious discourse; keyword analysis; lexical patterns; Pope Francis's *Laudato Si'*

1. Introduction

The environment is the context where life can emerge, evolve and come to an end. All the elements that are part of, and exist in, the environment, are interconnected by contact and/or chains of action/reaction. Therefore, the environment concerns all living entities.[2] Similarly, how the environment is talked about is relevant to all of us: the ways in which it is (re)presented and discussed may have far-reaching social consequences and political repercussions, both local and global, affecting the living conditions of all

---

[1] Both authors are responsible for the design of the study. The first author carried out the corpus analysis and wrote (sub-)Sections 3.2, 4.1 and 4.2, while the second author wrote(sub-)Sections 1, 2, 3.1 and 5.

[2] However, the fact that it is named *environment*, roughly meaning 'what surrounds us', suggests that is it not considered as important as humans (Goatly 2000, p. 278).

organisms. This is because "language does not passively reflect reality; language actively creates reality" (Halliday 2001 [1990], p. 179), and the way in which reality is constructed in texts affects our choice of action on that very reality (Goatly 2001 [1996], p. 212).

Environmental discourse is the object of study of ecolinguistics, which explores how natural phenomena are integrated into languages and cultures (Steffensen, Fill 2014), how language and the environment are co-constructed and inter-connected (Döring, Zunino 2014), and how language affects ecologically significant actions (Halliday 2007). Ecolinguistics is a socially committed discipline. It strives to critique ecologically destructive behaviour and to encourage relationships of respect and care for the natural world (Stibbe 2014). Therefore, it studies discourses about ecological matters, but also genres like "industry handbooks, lifestyle magazines and economic textbooks" (Stibbe 2014, p. 108), which can reveal what people consider valuable about the environment, and how they treat one another, other living organisms and the physical context in which they all live (Stibbe 2014, p. 109).

Because of its social commitment, ecolinguistics often examines the discourse of social actors with vested interests in phenomena and practices that impact on the environment, for example how British Petroleum comments on the 2010 oil spill (Alexander 2013), how European colonisers describe the "Indies" discovered by Columbus (Döring, Zunino 2014), and how industries and environmental organizations discuss ozone protection (Gerbig 1997). The discourse produced by such interest groups is worth examining because it shows how stakeholders conceptualise the environment and because it can influence public policy makers.

All discourses about ecological issues and those which have some impact on the environment are worthwhile objects of analysis for ecolinguistics. However, those produced by public figures – e.g. scientists, governmental authorities, religious leaders, and media professionals – deserve special attention. These may affect the conscience and conduct of millions of people: they inform the general public about what is known and understood about the environment; they convey beliefs, values and attitudes relevant to it; and they shape collective behaviour.

Yet, not enough is known about such public environmental discourses. For example, we do not know in much detail yet what information and viewpoints they convey, how their viewpoints are influenced by their authors' linguo-cultural backgrounds, or to what extent their communicative goals are informed by the roles their authors play in the professional-social world – scientists as investigators and educators, politicians as problem solvers and policy makers, religious authorities as spiritual guides, and journalists as reporters and opinion makers.

In this paper, we want to partly fill the above-mentioned knowledge gap

by exploring the ecological discourse of Pope Francis. This is an influential figure on the international political and cultural arena – what he says and does is echoed across the entire globe and becomes relevant to millions of people. He is the leader of the Catholic Church, and thus a theological authority and the supreme missionary of the Christian faith. But as the spiritual guide of millions of believers, Pope Francis is also an educator of and reference point for people's collective conscience. He is known for his opposition to consumerism and his commitment to solidarity. With the promulgation of his Encyclical Letter *Laudato Si'* ('Praise Be To You'; 2015), he has shown his support for safeguarding the well-being of humans and his concern for climate change.

As the following excerpt illustrates, *Laudato Si'* directly appeals to the reader to be pro-active about and protective of the environment:

> Our goal is not to amass information or to satisfy curiosity, but rather to become painfully aware, to dare to turn what is happening to the world into our own personal suffering and thus to discover what each of us can do about it. (Laudato Si', Ch. 1, 17).

As far as we know, no linguistic study has been carried out on *Laudato Si'*. However, insightful comments on this publication have been put forward by novelist and thinker Amitav Ghosh. In his non-fiction book *The Great Derangement* (2016), Ghosh examines the spectre of an impending environmental catastrophe looming on the horizon of modern society by pointing out the limits and incoherence of human agency in the social, economic, political and cultural arena. In particular, in Chapter 8, the author comments on the stylistic-rhetorical make-up of two public texts on ecological issues, namely Pope Francis's *Laudato Si'* and the *Paris Agreement* on climate change signed by the United Nations in 2015.[3] Ghosh observes how the former shares virtually the same sources and covers the same topics as the latter, but also how it is highly divergent in its formulation and stance. That is, he describes *Laudato Si'* as simple, sober and clear, and accessible to all readers. He also presents it as overtly critical of present-day paradigms, especially that of unlimited economic growth, which gives voice to the excluded masses making up most of humankind. Overall, Gosh argues that *Laudato Si'* is open and direct, as it considers ecological issues within the larger domain of social inequalities, and shows awareness of the limits of human freedom and abilities (Ghosh 2016, pp. 154-159).

The considerations made by Ghosh, which are backed up by quotations from the texts he compares and contrasts, suggest that a systematic comparative-contrastive textual examination of *Laudato Si'* vis-à-vis another

---

[3] https://unfccc.int/sites/default/files/english_paris_agreement.pdf.

piece of environmental discourse can be revealing and offer insights into its encoding and content, and a fuller understanding of its ideological orientation. This is what we set out to do in this paper.

In order to outline the distinctive lexico-phraseological encoding of *Laudato Si'*, we compare it with the environmental discourse of an organization that is as visible on the international arena as Pope Francis is, namely NASA, the National Aeronautics and Space Administration. This is an agency of the US federal government, which is responsible for aeronautics, space exploration and the study of the solar system. One of its mission directorates, NASA Science,[4] has a specific research and educational orientation: its mission is to understand, and share knowledge of, the universe, especially the composition, movement, physical forces and weather conditions of our solar system and planet.

NASA, therefore, regularly posts updates on scientific and technological advances relevant to the environment. These texts focus on the physical mechanisms of large-scale phenomena involving forces and entities in the world, and present scientists' rational perspective on them. These short reports are technical in content, and descriptive-informative in slant, as the following excerpt on climate change illustrates:

> The potential future effects of global climate change include more frequent wildfires, longer periods of drought in some regions and an increase in the number, duration and intensity of tropical storms. (https://climate.nasa.gov/effects; picture caption)

Although such online material may differ from *Laudato Si'* in drawing attention to different specific topics, projecting different attitudes, and being driven by different priorities and concerns, it is about the same general subject matter, and targets a similarly wide non-specialist readership as the Encyclical Letter. This makes it a suitable term of comparison. We therefore examine the content and encoding of Pope Francis's *Laudato Si'* by contrasting it against a selection of NASA's online texts on global climate change through a corpus-driven investigation of its lexis. Our goal is to explore what its lexical make-up can reveal about its focus (topics) and stance (positioning on the topics).

In Section 2, we provide more background for our study; in Section 3, we outline our data collection procedure and method of analysis; in Section 4 we report and discuss the findings of our investigation; and in Section 5 we draw implications from our research.

---

[4] https://science.nasa.gov/.

2. Literature review

Ecolinguistics brings together critical discourse analysis and social activism (e.g. Stibbe 2014, p. 119). This discipline investigates how humans relate to one another and to the larger ecological systems (Stibbe 2014), and how linguistic resources and practices may convey destructive vs supportive views of the environment (Alexander 2000; Halliday 2001 [1990]; Heuberger 2007; Mühlhäusler 2003; Stibbe 2014). It aims to reveal how communicative practices reflect, reproduce and sustain given ways of thinking, believing, feeling and acting. Another of its goals is to empower members of society to act upon these cognitive, emotional and cultural practices so as to reduce inequalities. Because it studies "the impact of language on the life-sustaining relationships among humans, other organisms and the physical environment" (Alexander, Stibbe 2014, p. 105), this research domain questions and exposes "the stories that underpin our current unsustainable civilisation", and is "normatively oriented towards preserving relationships which sustain life" (Alexander, Stibbe 2014, p. 105).[5] Therefore, ecolinguistics is not only descriptive-informative – reporting on the communicative practices of the actors that play a role in, and have their voices heard on, the environment – but also action-oriented – aiming at shaping people's behaviour for the preservation and thriving of the environment.

Ecolinguistic studies investigate recurrent communicative choices in texts about, or somehow having a bearing on, the environment. Recurrent linguistic patterns have the cumulative effect of representing the world in a consistent fashion. Identifying, describing and motivating these patterns shows what people come to perceive as the "normal" way of thinking of and attending to the world (Alexander, Stibbe 2014, p. 105). If these repeated phraseologies and conceptualisations are spelt out, they can be questioned, resisted or replaced with alternative ones (Stibbe 2015, pp. 86, 96).

Early on, Halliday (2001 [1990], pp. 192-193) pointed out how frequent verbal descriptions of phenomena may hide social-political meanings. For example, he showed how the systematic representation of growth as positive, including the growth of consumption of goods, conceals from consciousness the destructive power of consumerism, as growth entails the using up of resources. But he also observed that it would be possible to

---

[5] Ecolinguistics comprises the study of discourse on ecological matters and also "deeper reflections on the theories of language inspired by the holistic paradigm of ecology" (Bang, Trampe 2014, p. 83). The interaction between the two strands of research (i.e. the role of language in the investigation of environmental issues vs. the relationships between language and its socio-cultural environment) is discussed in Fill (1998). The evolution and perspectives of the discipline are discussed in Steffensen and Fill (2014). A specific overview of language ecology is given in Eliasson (2015).

use the power of grammar to redefine the concept (i.e. by replacing *growth* with *negative shrinkage*) so as to modify our way of thinking of, and conduct towards, consumerism. Halliday also raised our awareness of the grammatical representation, in European languages, of natural resources as existing without limit and of environmental phenomena as inanimate entities. Indeed, he illustrates how, typically, natural resources are encoded in uncountable nouns (e.g. water) and how environmental phenomena are not construed as active participants in events (i.e. as doers).

Most ecolinguistic research examines how interest groups argue for and propagate selected positions with regard to environmental issues, discussing them from different frames (e.g. scientific, political or moral), and giving visibility to or concealing different claims about them. This way, it shows how the environment can be conceptualised as a resource to be exploited or as a site of beauty inhabited by living creatures. Previous works have considered various topics, including: ecological crisis communication produced by multinationals (Alexander 2009, 2013); ecotourism discourse (Stamou, Paraskevopoulos 2008; Mühlhäusler 2000); the representation of nonhuman animals across genres (Gilquin, Jacobs 2006); the representation of anthropocentrism and speciesism (Stibbe 2003); the description of nature on the radio (Goatly 2002); climate change discourses in newspapers (Grundmann, Scott 2014; Grundmann, Krishnamurty 2010) and commercial science journalism (Molek-Kozakowska 2018); the conceptualisation of 'green' in news discourse (Bevitori 2011a); environmental issues in the multisemiotic news story genre (Bednarek, Caple 2010); debates on environmental issues in texts produced by industry and environmentalists (Gerbig 1997; Poole 2018); and the role of the environment in American presidential speeches (Bevitori 2011b).[6]

Given its diversified research focus (Chen 2016), ecolinguistics has explored manifold communicative practices in environmental discourse, including: narratives projecting different types of identity; descriptions of situations and reports of events with different degrees of factivity; representation of the degree of involvement of entities in situations/phenomena; the frequency of reference to, naming practices of, and degree of prominence of entities/phenomena in discourse (Stibbe 2015, Ch. 8); lexico-stylistic devices for rendering environmental information newsworthy and appealing (Molek-Kozakowska 2017), and also evaluative, narrative and framing strategies for obscuring it (Molek-Kozakowska 2018). From the lexico-grammatical point of view, ecolinguistic analyses have investigated: collocations, keywords and clusters (Gerbig 1997; Grundmann,

---

[6] References to additional studies in environmental discourse are found in Grundmann and Scott (2014, p. 221), Poole (2018, pp. 356-357) and Steffensen and Fill (2014, pp. 11-12).

Krishnamurty 2010; Grundmann, Scott 2014; Goatly 2002; Bevitori 2011a, 2011b); pronoun usage (Gilquin, Jacobs 2006); metaphor (Alexander 2013; Döring, Zunino 2014); the representation of agency (or lack thereof) through nominalisations (Gerbig 1997; Goatly 2001 [1996]), nominal compounding (Goatly 2001 [1996]), active/ergative/passive constructions (Gerbig 1997) and transitivity patterns (Goatly 2002); the representation of causation and responsibility through an analysis of ergative/reporting/attitudinal verbs and keywords (Gerbig 1997); explicit and implicit evaluative patterns (Bevitori 2011a; Bednarek, Caple 2010); and distancing techniques (Stibbe 2003).

The methods used include corpus linguistic techniques, critical discourse analysis, content analysis, and the application of the tools of systemic functional linguistics, possibly in combination. In this paper, we use corpus linguistic techniques to explore Pope Francis's view on the environment as conveyed in his *Laudato Si'*.

3. Data and method

Below we describe how we collected the data for our study, and report on how we carried out our analysis.

3.1. Data collection

The data we considered for our analysis comprises the English version of *Laudato Si'* downloadable from the Vatican website[7] and popularised updates on scientific advances available from the NASA website.[8]

Laudato Si' is an 82-page text with the following structure:

- a 5-page untitled introduction;
- Chapter 1: What is happening to our common home
- Chapter 2: The Gospel of creation
- Chapter 3: The human roots of the ecological crisis
- Chapter 4: Integral ecology
- Chapter 5: Lines of approach and action
- Chapter 6: Ecological education and spirituality
- A prayer for our earth
- A Christian prayer in union with creation

---

[7] http://w2.vatican.va/content/francesco/en/encyclicals/documents/papa-francesco_20150524_enciclica-laudato-si.html
[8] https://climate.nasa.gov/

- a 10-page list of references.

The introduction is divided into numbered paragraphs, some of which are grouped under headings. The chapters also comprise numbered paragraphs, which are grouped under headings and sub-headings. Altogether, the Encyclical Letter includes 246 paragraphs, the last one ending with two prayers. The References appear in the form of numbered end-notes. For our analysis, we considered the text from the title page to the prayers included.

The home page of the NASA website presents six menus (i.e. *Facts, Articles, Solutions, Explore, Resources* and *NASA Science*). Each is divided into sub-menus (e.g. *Facts* comprises *Evidence, Causes, Effects, Scientific Consensus, Vital Signs* and *Questions (FAQs)*), which present multi-modal updates on given topics. For our research, we considered the content of the *Facts* and *Articles* menus, which provide information about scientists' findings, and of the *Solutions* menu, which offers information on climate change. We chose to do so for two reasons: on one hand, we were interested in *verbal* accounts of environmental issues, which were prominent in the *Facts*, *Articles* and *Solutions* menus; on the other, we wanted to collect an amount of data comparable in size to that of *Laudato Si'*.

From the first 5 sub-menus of the *Facts* menu we downloaded the text appearing on the left-and-central portion of the page under titled sections. From the last sub-menu we selected the text of each question and the answer accessible after clicking on it, and in the first question, also the text of the second link listed under the heading *More*.

Under the *Articles* menu, we collected 18, 3 and 1 texts, respectively, from the *News*, *Blogs* and *Fun Facts* sub-menus. For each text from the *News* and *Blogs* sub-menus, we considered: the title, the first paragraph sentence, and the rest of the text body accessible by clicking on the title. From the *Fun Facts* sub-menu we selected the material accessible by clicking on the various links listed there.

From the *Solutions* menu, we selected the texts found in the *Mitigation and Adaptation* and *Government and Resources* sub-menus, and the text accessible through the first link in the *Energy Innovations* sub-menu.

We then deleted texts that appeared more than once. In the end, we gathered 6 texts from the *Facts* menu, 22 from the *Articles* menu, and 3 from the *Solutions* menu, for a total of 31 texts.

All the above texts were compiled into two corpora: *Laudato Si'* and the NASA corpus. Table 1 shows the size of the corpora in words and sentences. *Laudato Si'* is made up of 37,730 tokens and 4,878 types, and includes 1,520 sentences, while the NASA corpus comprises 37,840 tokens and 4,744 types, and instantiates 1,753 sentences. The two corpora display highly comparable type/token ratio values (12.92 vs 12.67, respectively),

which suggests that they are characterised by similar lexical variation. A difference emerges at the level of syntax, *Laudato Si'* being more elaborate than the NASA corpus, as revealed by their average sentence length (24.82 vs 21.58, respectively).

Statistics	*Laudato Si'*	NASA corpus
Types	4,878	4,744
Tokens	37,730	37,840
T/T ratio	12.92	12.67
Sentences	1,520	1,753
Average words per sentence	24.82	21.58

Table 1
Types, tokens, type/token ratios, number of sentences and average words per sentence in *Laudato Si'* and the NASA corpus.

The two corpora are therefore quite similar in size and lexico-syntactic elaboration. However, given their different focus, that is, the topics addressed and general communicative goals (see Section 1), we thought that the NASA corpus could serve as a useful term of comparison for *Laudato Si'*. In this study we therefore used it as our reference corpus. As observed by Gabrielatos (2018), a reference corpus does not have to be larger than the study corpus or to be a general corpus (see also McEnery 2016; Baker 2006).

3.2. Research questions and software

The analysis of the corpora considered was informed by the following research questions:

What topics are discussed in *Laudato Si'*?

Are the main topics discussed across all the chapters or only in select chapters of *Laudato Si'*?

What lexico-grammatical patterns mainly characterise the discourse of *Laudato Si'*?

We operationalised the above questions as follows:

What keywords characterise *Laudato Si'*, and what semantic fields do they belong to?

In which chapters of *Laudato Si'* do these keywords show up, and with what frequency?

What phraseological patterns of modality are revealed in *Laudato Si'* by clusters of select keywords?

The concordancing software chosen to explore the corpora is the free program *AntConc*, v. 3.5.7 (Anthony 2018). It provides a variety of tools, of which those mainly used to conduct this research were Keywords, Clusters,

Concordancer and Concordance Plots. In order to generate the keyword lists for analysis, we opted for the recommended keyness measure "Log-likelihood (4-term)" and keyword statistic threshold $p < 0.05$ (+Bonferroni).[9] After consulting recent research on "Effect Size metrics" (e.g. Gabrielatos 2018) and experimenting with the "Gabrielatos and Marchis%DIFF" metric embedded in the software, we decided to list the keywords we obtained in order of keyness by log-likelihood, because either parameter returned virtually the same list of keywords, albeit partly in a different order.

4. Findings and discussion

The exploration of *Laudato Si'* starts with the study and qualitative interpretation of the keywords obtained from its comparison to the NASA corpus and an overview of the topics dealt with in it (Section 4.1). It then compares the internal sub-division of *Laudato Si'* through the examination of keyword lists and concordance plots (Section 4.2). Finally, it delves into the phraseology of modal expressions through the study of clusters of keywords (Section 4.3).

4.1. The main topics

The technical procedure outlined in Section 3.2 generated 140 keywords. We checked the keyword list independently and assigned each keyword to one main semantic field among the following twelve: *Author, Ecology, Economics, Humanity, Mental processes, Modality, Society, Spatial context, Supernatural, Textual relations, Time frame* and *Values.* To make our decisions, we examined the concordance lines of each keyword occurrence. We disregarded thirteen keywords that we could not confidently assign to any of the above semantic fields and/or which we did not reach consensus on, and thus considered 127 keywords.

Table 2 shows the keywords subdivided according to the semantic fields they were associated with. The first column displays the fields in order of decreasing textual prominence, depending on the number of keywords associated with them, while the third column presents the keywords relevant to each field in decreasing order of keyness.

---

[9] This *p* value is suggested by Baker (2006, p. 126) among others.

Semantic fields	No. of keywords	Keywords
Values	20	love, life, care, good, responsibility, meaning, beauty, integral, dialogue, dignity, faith, respect, sense, freedom, peace, spirituality, attention, justice, creativity, heart
Society	17	social, problems, relationship, others, political, society, forms, church, culture, cultural, family, lifestyle, power, lack, politics, education, violence
Textual relations	17	which, of, who, to, be, not, their, all, and, yet, with, themselves, towards, for, order, cf, thus, (reality)
Economics	16	countries, progress, economic, development, poor, consumption, interests, crisis, production, developing, develop, financial, economy, technological, paradigm, growth
Humanity	15	us, human, beings, we, he, our, humanity, man, ourselves, capable, personal, person, your, relationships, everyone, (him), (his)
Ecology	14	creation, nature, environment, creatures, ecological, environmental, common, resources, ecology, created, creature, things, degradation, her
Supernatural	12	god, his, lord, him, saint, praise, jesus, creator, himself, father, divine, spirit, (he)
Modality	6	must, cannot, need, needs, should, can
Mental processes	4	concern, consider, acknowledge, entails
Spatial context	3	world, reality, universe
Time frame	2	present, often, (yet)
Author	1	I

Table 2

The keywords in *Laudato Si'* (Note: keywords listed twice are relevant to two fields. They appear in parentheses under the field they are less frequently associated with).

The keywords identified and their semantic fields reveal the focus of Pope Francis's discourse and style. The semantic field *Values* contains the largest number of keywords. These not only represent fundamental spiritual and religious values for Christians, but are also relevant to all human beings, who are responsible for solving the current ecological crisis. When addressing societal issues (see category *Society*), the Pope considers such phenomena as politics, culture, education and the Church, and points out the various problems society is affected by, the most prominent of which appears to be violence. Of course, economics is also part of society, but in the Letter it appears to deserve an independent status as a semantic field: specific reference is made to countries that should strive for progress, development, economic and spiritual growth, and should take action in favour of the poor. The field of *Humanity*, of course, encompasses all of us human beings, and that of *Ecology* shows the Pope's concern for the natural world. Together, they indicate how everyone should be concerned with ecology in all its aspects and fight against environmental degradation. Unsurprisingly, the Pope professes his faith in the *Supernatural*, the next semantic field in the table. He makes reference to God – *God* being the second highest ranking keyword in the corpus overall – to the Holy Spirit and to the teaching of Jesus and of various saints.

A clarification needs to be made about the pronoun forms *he, him* and *his* associated with both the *Supernatural* and the *Humanity* semantic fields. The pronoun form *he* is used 88 times altogether, of which 34 times (38%) with reference to either God or Jesus and 54 times (62%) with reference to other entities, mainly man (i.e. all human beings), Saint Francis, previous popes and biblical figures. We, therefore, decided to list *he* under the category *Humanity* and to include it in the *Supernatural* one in brackets. By contrast, the pronoun forms *his* and *him* predominantly refer back to God and Jesus (67% and 90% of the times, respectively), and we therefore assigned them to the category *Supernatural* and put them in brackets under *Humanity.*

The remaining semantic fields shed light on other aspects of the Encyclical Letter. For example, the keywords in *Textual relations* include the pronoun *which*, which scores the highest keyness value and ranks among the most recurrent words in the text. A look at a selection of concordance lines in Figure 1 shows that this pronoun is used in both non-restrictive and restrictive relative clauses.

DNA, and many other abilities	which	we have acquired, have given
basis of the Genesis account	which	grants man "dominion" over the
can encourage ways of acting	which	directly and significantly affect
proposals for dialogue and action	which	would involve each of us
be sufficient to prevent actions	which	affect the environment because, wh
limits of this human activity,	which	is a form of power
extreme consumerism and affluence	which	makes it difficult to develop
sually produce specious agreements	which	fail to inform adequately and
spite the international agreements	which	prohibit chemical, bacteriological
ls to internationalize the Amazon,	which	only serve the economic interests

Figure 1
Concordance lines for *which.*

The recurrent use of *which* in restrictive relative clauses – where the pronoun *that* or the zero pronoun could have been used to refer to the object of the clause – represents a mark of stylistic formality in the papal document. Also the keyword *yet* mainly performs a textual function and thus contributes to the *Textual relations* semantic field. It is used as a conjunction of clauses or as a coordinator within phrases in 39 out of 45 cases (87%) and only 6 times (13%) as a time adverbial. Figure 2 provides a selection of concordance lines illustrating these three uses.

Like *yet*, also the conjunctive adjunct *thus* and the abbreviation *cf* contribute to the formality of the Pope's writing style. Finally, the keyword *reality* is used 41 times in the document. More specifically, it is used four times (9%) as part of the linking adverbial *in reality*, while in 37 other instances (91%) it expresses the concept of what actually happens or is true.

has humanity had such power over itself,	yet	nothing ensures that it will be used
subject to the laws of the market.	Yet	access to safe drinkable water is a
will have to be compensated for by	yet	other techniques which may well prove harmful.
more common. Laws may be well framed	yet	remain a dead letter. Can we hope,
new start, but we have not as	yet	developed a universal awareness needed to achieve
consume and destroy, while others are not	yet	able to live in a way worthy

Figure 2
Concordance lines for *yet.*

In the semantic field *Time frame*, the keywords *present* and *often* indicate that this document is oriented towards the description and critical evaluation of the present time frame and of habitual rather than future events. Figure 3 illustrates this tendency and shows that *present* is mainly used as a predicative or attributive adjective:

of the Catholic Church, 310. God is intimately	present	to each being, without impinging on the
nowhere else to go. The impact of	present	imbalances is also seen in the premature
analysis of realities in the service of	present	needs, is at work whether resources are
to see the deepest roots of our	present	failures, which have to do with the
inability to broaden the scope of our	present	interests and to give consideration to those
a licence to carrying on with our	present	lifestyles and models of production and
have attempted to take stock of our	present	situation, pointing to the cracks in the
crisis; to avoid any deterioration of the	present	crisis and the greater imbalances that would
it allow for the radical change which	present	circumstances require. Rather, it may simply

Figure 3
Concordance lines for *present.*

In fact, the Letter also provides indications about the future, and does so through the extensive use of the expressions of obligation/necessity *must*, *cannot*, *need*, *should, can,* which make up the field *Modality.* Their presence indicates that the document is characterised by a directive function. Through these items the Pope encourages his readers to take action to solve environmental problems and grow spiritually. The concordance lines or *need* in Figure 4 give a flavour of this call for action (for more details on modality, see Section 4.3):

in these areas. 151. There is also a	need	to protect those common areas, visual landmarks
economies. In this context, there is a	need	for common and differentiated responsibilities.
urban landscape. Many specialists agree on the	need	to give priority to public transportation. Yet
of progress and human development. But we	need	to grow in the conviction that a
transcending immediate economic interest. We	need	to stop thinking in terms of "interventions"
free of the obsession with consumption. We	need	to take up an ancient lesson, found

Figure 4
Concordance lines for *need.*

The semantic field we labelled *Author* is only made up of the frequently employed first person pronoun *I*, which stands for the author of the Letter, viz. the Pope. Furthermore, the processes of cognition listed under *Mental processes* (i.e. *concern, consider, acknowledge, entails*) indicate that the author invites his readers to become aware of our current environmental and spiritual situation and to ponder over it, in the attempt to find ways to improve it. Finally, *Spatial frame* suggests that the Pope's discourse is not limited to *reality* and this *world,* but extends to the *universe.*

4.2. Dispersion of keywords

Judging from the titles of its chapters, *Laudato Si'* appears to have at times a stronger economic and ecological slant (i.e. Chapters 1, 3, 4 and 5), and at other times a more religious and pastoral thrust (i.e. Chapters 2 and 6). In an attempt to ascertain whether this was the case, we first obtained keyword lists for groups of chapters. We compared the word lists for Chapters 1, 3, 4 and 5 (21,591 tokens; 3,590 types) with those for Chapters 2 and 6 (12,914 tokens; 2,513 types) and the other way round. Subsequently, we generated concordance plots to visually represent the distribution of specific keywords.

The left side of Table 3 lists the 8 keywords obtained for Chapters 1, 3, 4 and 5 (vs Chapters 2 and 6), while the right side presents the first 10 keywords (out of 31) for Chapters 2 and 6 (vs Chapters 1, 3, 4 and 5) and their frequencies. The keywords are given in decreasing order of keyness.

Ch. 1, 3, 4 and 5 vs Ch. 2 and 6		Ch. 2 and 6 vs Ch. 1, 3, 4 and 5	
Frequency	*Keywords*	*Frequency*	*Keywords*
47	countries	132	god
31	technology	40	you
29	energy	55	his
44	problems	55	he
39	resources	28	him
26	pollution	120	us
23	economy	27	your
21	technological	40	creatures
		26	lord
		40	love

Table 3
The keywords for Chapters 2 and 6 and those for Chapters 1, 3, 4 and 5.

As can be noticed, the subdivision of keywords in Table 3 lends support to the observation that Chapters 1, 3, 4 and 5 concern technological, economic and pollution issues, and that Chapters 2 and 6 are mainly about religious matters.

Concordance plots visualise the position of the various occurrences of a given term in the text. In this study we used them to check whether the

keywords *countries, technology, problems*, *God, you, his, he, we, human* and *world* are used in the whole text or only in some chapters. As can be seen from the three plots in Figure 5, the words *countries, technology* and *problems* are clearly more recurrent at the beginning of the Encyclical Letter (Chapter 1), are rarely used in the following chapter, and are resumed in Chapters 3 to 5. This finding thus lends support to the hypothesis that Chapters 1, 3, 4 and 5 are mainly concerned with economic and ecological issues.
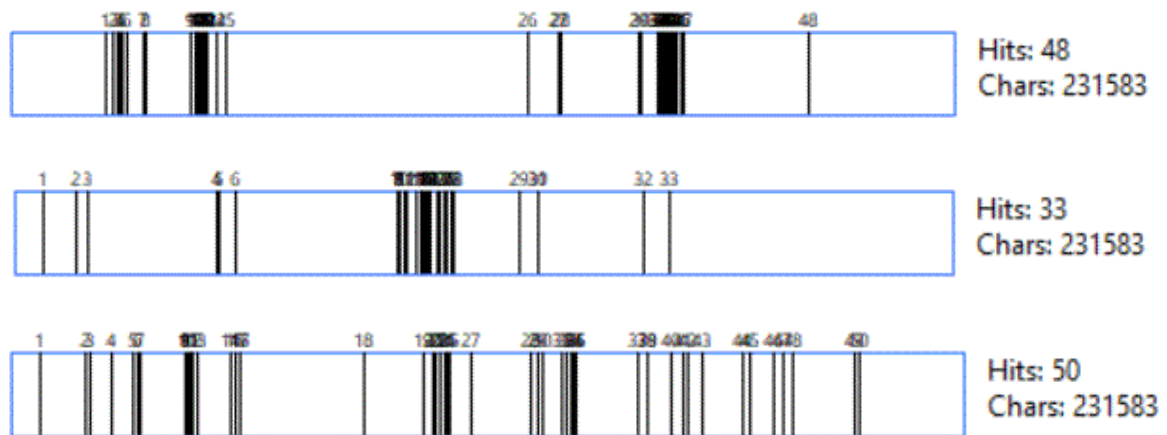

Figure 5
Concordance plots for *countries*, *technology* and *problems* in *Laudato Si'*.

Extract (1) is taken from Chapter 1 and shows how some of the above keywords are used in context:

(1)   Some forms of <u>pollution</u> are part of people's daily experience. Exposure to atmospheric pollutants produces a broad spectrum of health hazards, especially for the poor, and causes millions of premature deaths. People take sick, for example, from breathing high levels of smoke from fuels used in cooking or heating. There is also <u>pollution</u> that affects everyone, caused by transport, industrial fumes, substances which contribute to the acidification of soil and water, fertilizers, insecticides, fungicides, herbicides and agrotoxins in general. <u>Technology</u>, which, linked to business interests, is presented as the only way of solving these <u>problems</u>, in fact proves incapable of seeing the mysterious network of relations between things and so sometimes solves one <u>problem</u> only to create others. (our underlining)

The four plots in Figure 6 represent the dispersion of *God, you, his* and *he*, four keywords denoting *Supernatural* entities. As can be seen by comparing them against those in Figure 5, they occur in portions of the texts other than those where economic and ecological matters are discussed. Specifically, they are very frequently used in Chapters 2 and 6, which indicates that these chapters principally address religious issues.

*L*₉ingue e
*L*₉inguaggi

Figure 6
Concordance plots for *God, you, his, he* in *Laudato Si'*.

Extract (2) from Chapter 2 illustrates the recurrent use of some of these keywords as well as the religious orientation of the chapter:

(2)   We are not <u>God</u>. The earth was here before <u>us</u> and it has been given to <u>us</u>. This allows us to respond to the charge that Judaeo-Christian thinking, on the basis of the Genesis account which grants man "dominion" over the earth (cf. Gen 1:28), has encouraged the unbridled exploitation of nature by painting <u>him</u> as domineering and destructive by nature. This is not a correct interpretation of the Bible as understood by the Church. Although it is true that we Christians have at times incorrectly interpreted the Scriptures, nowadays we must forcefully reject the notion that our being created in <u>God'</u>s image and given dominion over the earth justifies absolute domination over other <u>creatures</u>. The biblical texts are to be read in their context, with an appropriate hermeneutic, recognizing that they tell <u>us</u> to "till and keep" the garden of the world (cf. Gen 2:15). (our underlining)

The keywords we have discussed so far can be called "local" keywords (Scott, Tribble 2006, p. 66), as they are not used consistently throughout the text. However, in *Laudato Si'* there are also "global" keywords, that is, keywords dispersed throughout the text. This is the case, for example, of the inclusive pronoun *we* and of the words *human* and *world*, as can be seen from Figure 7.

Figure 7
Concordance plots for *we*, *human* and *world* in *Laudato Si'*.

To conclude, the lists of keywords obtained from the comparisons of different groups of chapters in *Laudato Si'* and the concordance plots that visualise their dispersion suggest that the text as a whole calls all human beings to action. However, Chapters 1, 3, 4 and 5 delve specifically into various aspects of current environmental issues, while Chapters 2 and 6 explore the religious implications of the environmental crisis.

4.3. Textual patterns of modality

In this section we explore modality in *Laudato Si'*. We first explore clusters containing expressions of modality in combination with the general keyword *we*, one of the most frequent words in the document and a global keyword. We then focus on modal expressions with grammatical subjects other than *we*, which we thought would be particularly revealing of the author's stance. To this end, we used the Clusters Tool in *AntConc*, which allows one to identify strings of words that recurrently cluster together through a bottom-up approach and makes it possible to gain information about the immediate co-text in which terms are used.

Table 4 presents the thirty most recurrent 2-word clusters beginning with *we* with a minimum frequency of 3 occurrences. It shows that this pronoun is often followed by *can, need, cannot, must, should, would, may* or *will.* At other times, it is used as the subject of predicates containing the verbs of cognition/affection *see, know, learn, think, want, feel, consider* and *look.*

Rank	Freq.	Clusters	Rank	Freq.	Clusters	Rank	Freq.	Clusters
1	43	we are	11	6	we would	21	4	we not
2	34	we can	12	5	we fail	22	4	we think
3	34	we have	13	5	we may	23	4	we want
4	24	we need	14	5	we were	24	3	we believers
5	13	we see	15	5	we will	25	3	we consider
6	8	we cannot	16	4	we all	26	3	we feel
7	8	we must	17	4	we continue	27	3	we lack
8	8	we should	18	4	we find	28	3	we look
9	7	we do	19	4	we learn	29	3	we ourselves
10	7	we know	20	4	we live	30	3	we share

Table 4
The most recurrent 2-word clusters with the pronoun *we*.

Expressions starting with *we* + a modal verb serve to call attention to options and constraints in collective human actions and experiences, and especially collective responsibility towards the environment. *We can* expresses Pope Francis's conviction that human beings have the ability to do something (e.g. *we can redirect our steps*) or no longer have the option to do something (e.g. *we can no longer view reality in a purely utilitarian way*), while *we cannot* indicates that we are unable to do something (e.g. *we cannot control them)*. With the cluster *we need/must/should* he attempts to direct us towards a given behaviour (e.g. *we need also to think of containing growth*; *we must regain the conviction that we need one another*; *we should be concerned for future generations*), while with *we may* he predicts the likelihood that specific events, especially negative ones, will take place (e.g. *we may well be leaving to coming generations debris, desolation and filth*).

Table 5 displays the first twenty 3-4 word clusters around *we*. Most of them contain the same modal expressions and verbs of cognition/affection which we have just discussed. However, another modal expression emerges from this list: *we are called to.*

Rank	Freq.	Clusters	Rank	Freq. (cont.)	Clusters
1	14	we need to	11	3	we can no
2	6	we are called	12	3	we can no longer
3	5	we are called to	13	3	we can see
4	5	we do not	14	3	we continue to
5	5	we fail to	15	3	we have to
6	4	we know that	16	3	we need only
7	4	we learn to	17	3	we see this
8	4	we see how	18	3	we should be concerned
9	4	we should be	19	3	we should not
10	4	we want to	20	3	we would be

Table 5
The most recurrent clusters with the pronoun *we*.

We are called to is a near-modal expression of obligation, which represents yet another linguistic realisation of the Pope's call for commitment to

ecology and ecological spirituality. Figure 8 shows the concordance lines for *we are called to,* illustrating how people should take action. That is, *we* all should: acknowledge our *contribution* (to the disfigurement and destruction of creation); be *instruments of God*; *recognize that other living beings* (have a value of their own in God's eyes); *respect creation*; *include in our work a dimension of receptivity* (and gratuity).

generate small ecological damage",	we are called to	acknowledge "our contribution
the last two hundred years. Yet	we are called to	be instruments of God
to use the earth's goods responsibly,	we are called to	recognize that other living beings
dignity and our gift of intelligence,	we are called to	respect creation and its inherent laws
important about work: its meaning.	We are called to	include in our work a dimension of receptivity

Figure 8
Concordance lines for *we are called to.*

Besides *are called to*, the clusters in Table 5 show additional near-modal expressions. These include *we do not, we fail to*, which indicate inability to experience/act or conscious choice not to act, and also *we learn to, we see how,* and *we see this*, which indicate ability to experience phenomena.

After examining the patternings of *we* with the above modal and near-modal verbs, we also checked whether these modal expressions occur with other subjects. To do so, we searched the Encyclical Letter for 2-word clusters obtained from *AntConc* by setting the search term position to the right. Table 6 shows the most recurrent clusters for the key modal expressions *must, can(not), need(s)* and *should* with a minimum frequency of 1 occurrrence.

	Must			*Can(not)*			*Need(s)*			*Should*	
Rank	Fr.	Clusters	Fr.	Clusters	Fr.	Clusters	Fr.	Clusters	Fr.	clusters	
1	8	we must	42	we can/cannot	24	we need	8	we should			
2	6	it must	19	which can/cannot	5	they need	4	it should			
3	2	he must	6	it can/cannot	3	it needs	3	this should			
4	2	politics must	3	one can	1	approach needs	2	which should			
5	2	society must	3	problems cannot	1	attention needs	1	assessment should			
6	2	which must	3	they can	1	debate needs	1	believers should			
7	1	account must	3	who can	1	efforts need	1	consensus should			
8	1	attention must	2	community can	1	places need	1	creativity should			
9	1	beings must	2	education can	1	politics needs	1	education should			
10	1	consideration must	2	environment can	1	questions need	1	goal should			

Table 6
The most recurrent 2-word clusters with modal verbs on the right position.

As can be seen, some other pronouns other than *we* tend to rank high on the lists (e.g. *it, he, they, which, one, this*). The modal verbs, however, are also used in combination with subject noun phrases denoting human institutions or activities (e.g. *politics, society, community, education),* groups of people (e.g.

beings, believers), or cognitive processes or procedures (e.g. *attention, consideration, approach, assessment, efforts).*

Overall, the modal expressions identified and their patterns of occurrence suggest that *Laudato Si'* is mainly oriented towards the expression of deontic modality, qualifying the degree of human involvement in and responsibility for the well-being of the planet. Additionally, the findings show that the text draws attention to the possibility for humankind to perceive and become aware of the planet's present condition and future prospects.

5. Conclusion

In this study, our goal was to describe the lexico-phraseological patterns in the communicative practices of an environmentally conscious, religion-inspired publication targeting a lay audience, with a view to revealing how it attends to ecological matters. We set out to outline recurrent, salient topics and notions in *Laudato Si'* and how these are represented by comparing it against a corpus of NASA texts on similar topics and of similar size.

The keyword analysis shows that *Laudato Si'* covers the domain of the environment (*Ecology*) as intimately interconnected with other global social phenomena (*Society, Economics*) and as relevant to humankind (*Humanity*), its physical context (*Spatial context*) and the divine (*Supernatural*). Environmental issues are also presented as important for the immediate present and future circumstances of humanity (*Time frame*), and described as part of a crucial aspect of moral consciousness (*Values*). The general stance of the text is that of a formal, yet reader-friendly (*Textual relations*) and collaborative communicative process, in which the Pope (*Author*) directly involves the readership in an awareness-raising initiative (*Modality, Mental processes*) on the value of the environment and people's collective responsibility for it. All these semantic domains appear to be discussed with everyday rather than technical/sophisticated terms (e.g. *lifestyle, love, world*).

Laudato Si' also appears to have a narrative development, in the sense that not all its chapters cover the same topics, judging from its lexis. The dispersion of the keywords across the text signals, on one hand, its thematic uniformity, and on the other, its internal textual boundaries (i.e. topic shifts). *Laudato Si'* appears to stress the bonds of communion of all creatures from beginning to end; yet, while Chapters 1, 3, 4 and 5 are strongly focused on environmental issues (see the prominence of such keywords as *energy, pollution* and *resources*), Chapters 2 and 6 are more reflective of the relationship between human beings and the divine, characterized by benevolence (see the prominence of such keywords as *God, creatures* and *love*).

Finally, the keyword cluster analysis shows that *Laudato Si'* recurrently refers to relationships, principles and processes collectively involving, affecting or appealing to human beings as members of interrelated social groups. Indeed, *Laudato Si'* highlights the interactive dimension of environmental discourse (see the frequent use of inclusive *we*), calls attention to the need for a caring attitude towards the environment (see the use of modals of necessity/obligation), and focuses on the current and prospective time frame (see the use of the present tense and modal verbs).

Overall, the analysis shows how linguistic features recurrently instantiated in the text come to encode a consistent worldview, that is, a stance conveying coherent values, beliefs and opinions (Stibbe 2014, pp. 122-124). *Laudato Si'* frequently refers to the conceptual domains of religious and human values. It is focused on the importance of the bond between human beings, their common home, and the divine. It reflects on the social actors involved in environmental issues, their attitude and actions; it also considers the (risky) processes affecting the natural world, and assesses the interconnectedness of them all.

The Encyclical Letter instantiates a discourse "which could potentially help protect and preserve the conditions that support life" (Stibbe 2014, p. 119) through the presentation of a socially committed approach to ecology. *Laudato Si'* presents data on the natural world with a reflective and interpersonal orientation. It explains to the lay audience how living beings depend on one another for their survival, and it is informed by "an ethical framework to decide why survival and flourishing matters and whose survival and flourishing matters" (Stibbe 2014, p. 119). For its author, the natural world is a crucial element of a shared life-sustaining system.

Our analysis suggests that a lexico-phraseological description of environmental discourse can fruitfully contribute to uncovering the ideas, beliefs and values encoded in it. The findings presented here reveal not only what the text examined is about, but also its rhetorical goals. Confirmation of the present findings could come from widening the scope of the object of analysis – to include, e.g., metaphors and explanation strategies – and/or from applying complementary analytical tools – such as automatic semantic tagging – and/or from carrying out comparative analyses with different datasets (e.g. *Laudato Si'* against the *Paris Agreement*).

*L*ingue e
*L*inguaggi

Bionotes: Erik Castello (Ph.D., University of Padua, 2007) is associate professor of English language and linguistics at the University of Padua, Italy. His research interests include (learner) corpus linguistics, the language of tourism, systemic functional linguistics and language testing. He has recently examined aspects of written and spoken learner language, including the use of *it*-extraposition constructions and that of discourse markers, and aspects of tourism discourse, including the use of evaluative language and locative constructions. He has published several articles on these topics. He has recently co-edited a volume on Learner Corpus Research.

Sara Gesuato (Ph.D., University of Padua, 1999, University of California at Berkeley, 2004) is associate professor of English language and linguistics at the University of Padua, Italy. Her research interests include pragmatics, discourse and genre analysis, verbal aspect, and corpus linguistics. In her publications, she has discussed the structure and wording of initiating and reacting speech acts, the phraseology and rhetorical structure of academic genres, and the temporal and aspectual meanings of catenative motion verb constructions. She has recently co-edited two volumes on pragmatic issues in language teaching and learning and is currently investigating pedagogical applications of speech act analysis.

Authors' addresses: erik.castello@unipd.it, sara.gesuato@unipd.it

References

Alexander R.J. 2000, *The framing of ecology: some remarks on the relation between language and economics*, in Kettemann B. and Penz H. (eds.), *ECOstructing language, nature and society. The ecolinguistic project revisited*, Stauffenburg, Tübingen, pp. 173-190.

Alexander R.J. 2009, *Framing Discourse on the Environment. A Critical Discourse Approach*, Routledge, New York/London.

Alexander R.J. 2013, *Shaping and misrepresenting public perceptions of ecological catastrophes: the BP Gulf oil spill*, in "Critical Approaches to Discourse Analysis across Disciplines" 7 [1], pp. 1-18.

Alexander R.J. and Stibbe A. 2014, *From the analysis of ecological discourse to the ecological analysis of discourse*, in "Language Sciences" 41, pp. 104-110.

Anthony L. 2018, *AntConc (Version 3.5.7) [Computer Software]*, Tokyo, Japan, Waseda University. http://www.laurenceanthony.net/software (10.01.2018).

Baker P. 2006, *Using Corpora in Discourse Analysis*, Continuum, London.

Bang J.C. and Trampe W. 2014, *Aspects of an ecological theory of language*, in "Language Sciences" 41 [5], pp. 83-92.

Bednarek M. and Caple H. 2010, *Playing with environmental stories in the news – good or bad practice?*, in "Discourse & Communication" 4 [1], pp. 5-31.

Bevitori C. 2011a, *'Jumping on the green bandwagon': The discursive construction of GREEN across 'old' and 'new' media genres at the intersection between corpora and discourse*, in *Corpus Linguistics 2011 – Discourse and Corpus Linguistics*, University of Birmingham, 20-22 July 2011.

Bevitori C. 2011b, *Discursive construction of the environment in American presidential speeches 1960-2013: a diachronic corpus-assisted study*, in McEnery T. and Baker P. (eds.) *Corpora and discourse studies: integrating discourse and corpora*, Basingstoke, Palgrave MacMillan, pp. 110-133.

Chen S. 2016, *Language and ecology: A content analysis of ecolinguistics as an emerging research field*, in "Ampersand" 3, pp. 108-116.

Döring M. and Zunino F. 2014, *Nature Cultures in Old and New Worlds. Steps towards an ecolinguistic perspective on framing a 'new' continent*, in "Language Sciences" 4, pp. 34-40.

Eliasson S. 2015, *The birth of language ecology: interdisciplinary influences in Einar Haugen's "The ecology of language"*, in "Language Sciences" 50, pp. 78-92.

Fill A. 1998, *Ecolinguistics – State of the art 1998*, in "Arbeiten aus Anglistik und Amerikanistik" 23 [1], pp. 3-16.

Gabrielatos C. 2018, *Keyness analysis: nature, metrics and techniques*, in Taylor C. and Marchi A. (eds.), *Corpus Approaches to Discourse: A critical review*, Oxford, Routledge, pp. 225-258.

Gerbig A. 1997, *Lexical and grammatical variation in a corpus. A computer-assisted study of discourse on the environment. Duisburg Papers on Research in Language and Culture, vol. 33*, Peter Lang, Frankfurt am Main.

Gilquin G. and Jacobs G.M. 2006, *Elephants (who) marry mice are very unusual: the use of the relative pronoun "who" with nonhuman animals*, in "Society & Animals" 14 [1], pp. 79-105.

Goatly A. 2000, *Critical reading and writing*, Routledge, London/New York.

Goatly A. 2001 [1996], *Green grammar and grammatical metaphor, or language and myth of power, or metaphors we die by*, in Fill A. and Mühlhäuser P. (eds.) *The ecolinguistics reader. Language, ecology and the environment*, Continuum, London, pp. 203-225.

Goatly A. 2002, *The representation of nature on the BBC World Service*, in "Text" 22 [1], pp. 1-27.

Ghosh A. 2016, *The great derangement. Climate change and the unthinkable*, The University of Chicago Press, Chicago/London.

Grundmann R. and Krishnamurthy R. 2010, *The discourse of climate change: a corpus-based approach*, in "Critical Approaches to Discourse Analysis across Disciplines" 4 [2], pp. 125-146.

Grundmann R. and Scott M. 2014, *Disputed climate science in the media: Do countries matter?*, in "Public Understanding of Science" 23 [2], pp. 220-235.

Halliday M.A.K. 2001 [1990], *News ways of meaning. The challenge to applied linguistics*, in Fill A. and Mühlhäusler P. (eds.), *The ecolinguistics reader. Language, ecology and environment*, Continuum, London, pp. 175-202.

Halliday M.A.K. 2007, *Applied linguistics as an evolving theme*, in Webster J. (ed.), *Language and Education: Collected Works of M.A.K. Halliday*, Continuum, London, pp. 1-19.

Heuberger R. 2007, *Language and ideology. A brief survey of anthropocentrism and specism in English*, in Fill A. and Penz H. (eds.), *Sustaining language*, LIT-Verlag, Münster, pp. 105-124.

McEnery T. 2016, *Keywords,* in Baker P. and Egbert J. (eds.), *Triangulating Methodological Approaches in Corpus-Linguistic research*, Routledge, New York/London, pp. 20-32.

Molek-Kozakowska K. 2017, *Communicating environmental science beyond academia: Stylistic patterns of newsworthiness in popular science journalism*, in "Discourse & Communication" 11 [1], pp. 69-88.

Molek-Kozakowska K. 2018, *Popularity-driven science journalism and climate change: A critical discourse analysis of the unsaid*, in "Discourse, Context & Media" 21, pp. 73-81.

Mühlhäusler P. 2000, *Bleached language on unbleached paper. The language of ecotourism*, in Ketteman B. and Penz H. (eds.), *ECOnstructing Language, Nature and Society. The Ecolinguistic Project Revisited. Essays in Honour of Alwin Fill*, Stauffenburg Verlag, Tübingen, pp. 241-251.

Mühlhäusler P. 2003, *Language of environment – Environment of language*, Battlebridge, London.

Poole R. 2018, *Ecolinguistics, GIS, and Corpus Linguistics for the Analysis of the Rosemont Copper Mine Debate*, in "Environmental Communication" 12 [4], pp. 525-540.

Scott M. and Tribble C. 2006, *Textual patterns: Key words and corpus analysis in language education*, John Benjamins, Amsterdam/Philadelphia.

Stamou A.G. and Paraskevopoulos S. 2008, *Representing protection action in an ecotourism setting: a critical discourse analysis of visitors' books at a Greek reserve*, in "Critical Discourse Studies" 5 [1], pp. 35-54.

Steffensen S. and Fill A. 2014, *Ecolinguistics: The state of the art and future horizons*, in "Language Sciences" 41, pp. 6-25.

Stibbe A. 2003, *As charming as a pig: The discursive construction of the relationship between pigs and humans*, in "Society & Animals" 11 [4], pp. 375-392.

Stibbe A. 2014, *An ecolinguistic approach to critical discourse studies*, in "Critical Discourse Studies" 11 [1], pp. 117-128.

Stibbe A. 2015, *Ecolinguistics. Language, ecology and the stories we live by*, Routledge, London.

Webliography

Laudato Si', http://w2.vatican.va/content/francesco/en/encyclicals/documents/papa-francesco_20150524_enciclica-laudato-si.html(13.05.2018).
NASA, https://science.nasa.gov/(13.05.2018).
NASA, https://climate.nasa.gov/ (13.05.2018).
NASA, The consequences of climate change. https://climate.nasa.gov/effects(13.05.2018).
Paris Agreement, https://unfccc.int/sites/default/files/english_paris_agreement.pdf (13.05.2018).