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GODSCAPES: TOWARDS A MODEL OF MATERIAL RELIGION IN THE SECOND MILLENNIUM BCE LEVANT VIA SEMANTIC WEB ONTOLOGIES

1. Introduction

The project 'Godscapes: Modeling second millennium BCE Polytheism in the Eastern Mediterranean' (https://godscapes.unict.it/) aims at defining a new scientific method to understand how humans entangle with the divine through religious beliefs that are enforced by ritual behaviors and the related material culture. In fact, to reach this goal, the project combines a material perspective that, following the most recent approaches to religious studies that have formed the so-called 'material turn', stresses the pivotal role of material culture in shaping beliefs and practices, with an innovative use of the artificial intelligence, in particular, of the Semantic Web.

According to the project's objective, this fresh approach will aid in comprehending both ancient and modern forms of religiosity. The well-established methods and tools of the Semantic Web are in fact applied to link various aspects of human life and knowledge, and ultimately to generate knowledge graphs showing how these elements are related to each other in the construction of religious beliefs and practices.

The proposed method is tested on the complex forms of polytheisms that were practiced in the Levant during the second millennium BCE. Distinctive to this chronological macro-entity was in fact the involvement of the Canaanite city-states in the network of diplomatic and economic relations that from the North Africa and the Eastern Mediterranean reached as far as Central Asia, enhancing the circulation of people, things and ideas, and the creation of original forms of religious syncretism. Strategically located between Egypt and the Mesopotamian powers, the Levant, mainly referring to modern-day Israel, Palestine, Jordan, Lebanon and Syria, was central in the exchange process. It is in this complex cultural milieu, where local, exogenous and hybrid elements interacted with one another, that the roots of the Israelite monolatry of the first millennium BCE can be traced.

As correctly pointed out by Mark S. Smith (2001), the archaeological research in the area has created a massive amount of data that are fundamental to interpret the relationship between biblical monotheism and the polytheisms practiced in both ancient Israel and the neighboring cultures. However, holistic approaches considering the development of the Israelite monolatry within the complex polytheistic traditions attested during the second millennium BCE in the Eastern Mediterranean, and reaching as far as Egypt, the Aegean,

Anatolia, Syria and Mesopotamia, were only rarely applied (Oggiano 2005; Killebrew 2012; Koch 2019; Laneri 2024).

Targeting the phenomena of cultural hybridization that affected the religiosity of the communities inhabiting the Levant during the second millennium BCE, 'Godscapes' focuses on the analysis of four types of data – funerary, architectural, iconographic, and textual. In order to understand how the polytheistic sources had been rethought, triggered and reshaped in the process that will bring to the biblical monotheism, the project's approach will: 1) identify the exogenous and endogenous layers of religiosity; 2) define the diagnostic markers of the second millennium BCE Levantine religiosity; 3) demonstrate how a syncretic outcome can be considered as the result of a complex network of inter-religious encounters originated during the second millennium BCE (Laneri *et al.* 2024).

2. Description of methods

The methodology presented aims to create a model that elucidates the relationships among different material elements of religiosity during cultural transformations, adopting a comprehensive approach that considers the entanglement of material elements, humans, and ideas in the construction of religious beliefs and practices. In so doing, the research addresses fundamental questions about the transformation of autochthonous forms of religiosity by exogenous elements, identifying persisting and abandoned elements, and examining the social contexts in which these elements are most recognizable (Fig. 1).

Focusing on a defined geographical region (i.e., the Levant) and period (i.e., the second millennium BCE), the method involves deconstructing four fundamental aspects associated with material religiosity: religious architecture, religious iconography, funerary rituals/beliefs, and religious texts. Such

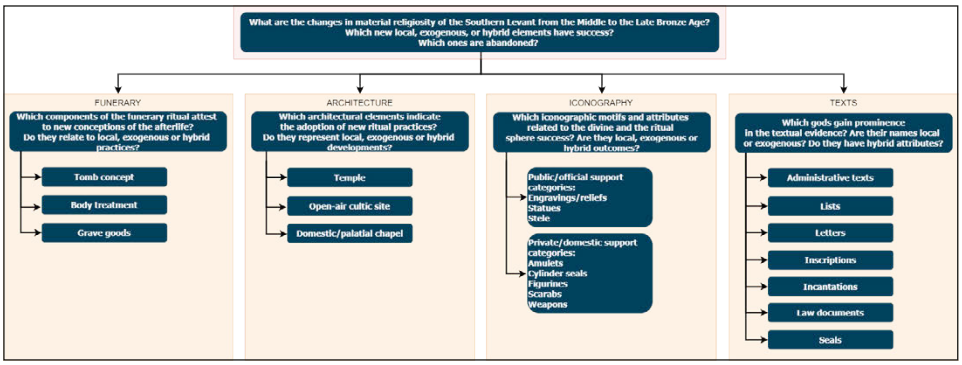

Fig. 1 – Fundamental research questions referring to the project's dataset.

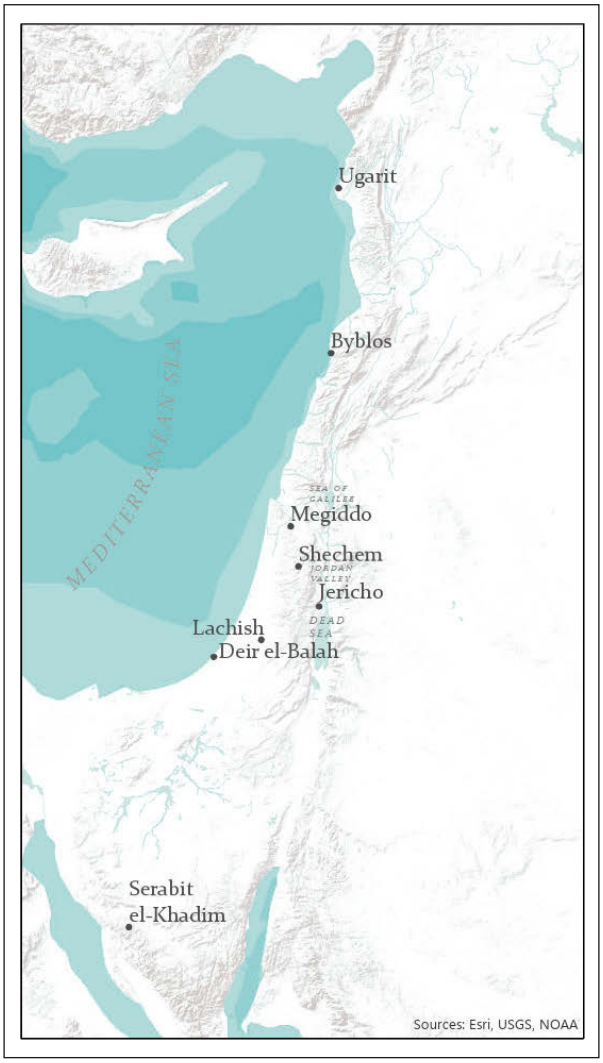

Fig. 2 – Map of the pilot archaeological sites whose data have been entered into the 'Godscapes' database.

deconstruction is operated through an epistemological process in which Semantic Web ontologies are suitably designed, implemented, linked to the most popular vocabularies in the field, and populated by entering the data from a set of pilot archaeological sites (i.e., Ugarit, Byblos, Shechem, Megiddo, Jericho, Lachish, Deir el-Balah, and Serabit el-Khadim) (Fig. 2). Such a

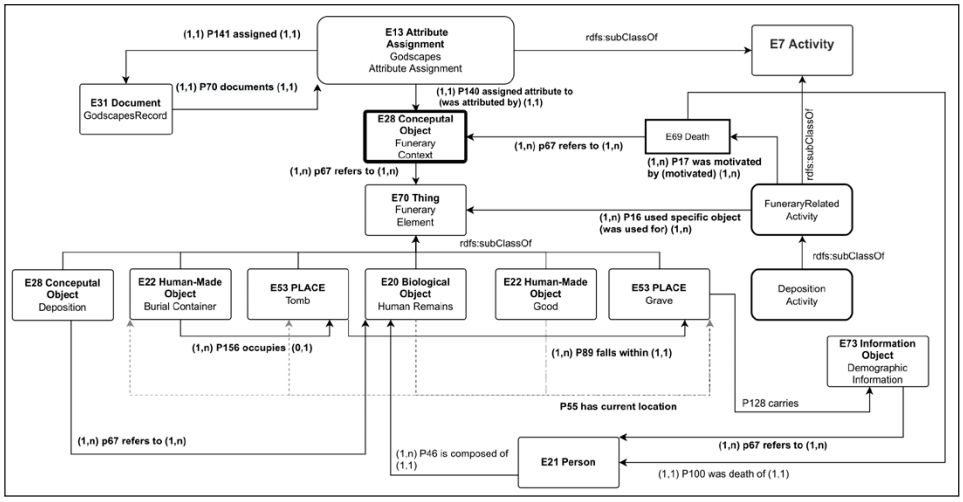

Fig. 3 – Model design of the 'Godscapes' ontology for the funerary data.

deconstruction employs the Web Ontology Language 2 (OWL 2) to represent a formal, shared conceptualization of the domain.

The Semantic Web, with its well-established methodologies and tools, provides a solid solution to semantically model application domains, integrate data, and make it globally accessible (Berners-Lee *et al.* 2001). It involves machine-readable data that enable software agents to query and manipulate information autonomously, promoting increased coherence and dissemination of knowledge. Automated reasoning procedures in the Semantic Web allow for the extraction and processing of implicit information, facilitating a deeper understanding of the domain (Staab, Studer 2010). Moreover, introducing rule of the Semantic Web Rule Language (SWRL) allows one for definitions not expressible in OWL 2, and it is often convenient in terms of efficiency of the reasoners.

The research plan has combined a top-down with a bottom-up approach, working on the conceptual layout of 'The Godscapes Ontology' ('TGO') while standardizing the metadata for the creation of the Godscapes database. Religious belief is considered as a co-product of the enactment of ritual behaviors, and cognitive representations that, according to the 'Mental Functioning Ontology', depend on individuals that have them as part of their mental outfit (Schulz, Jansen 2018). Within this broad category, the project focuses on other-than-human beings (from gods and goddesses to hybrid creatures and sacred animals) and myths. Ritual praxis is reconstructed from material correlates recognizable in the context of both funerary and

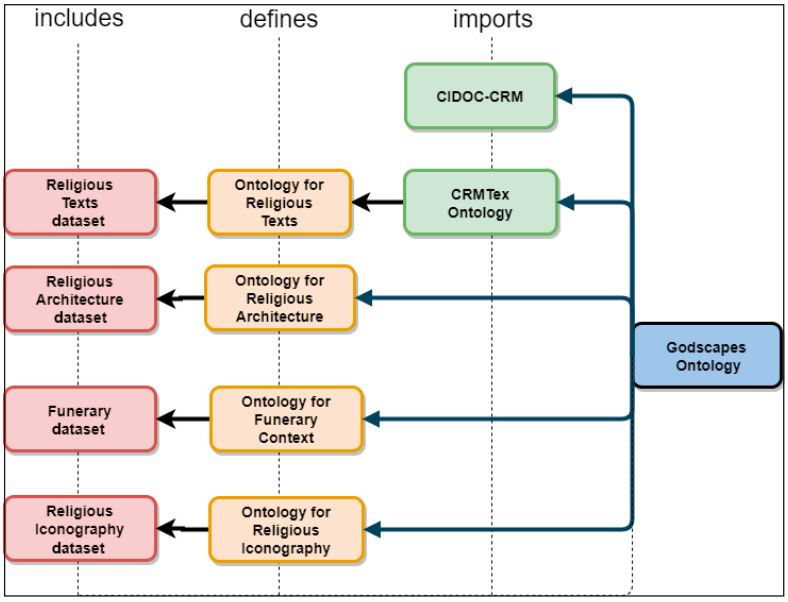

Fig. 4 – Diagram for TGO.

religious ritual. From these broad categories stem the hierarchies of classes of the four ontologies which represent the main core of the research agenda, that are funerary contexts, religious architecture, iconography and religious onomastics (Fig. 4).

The structure of the four 'Godscapes' OWL ontologies is mainly inspired by ontological models developed in previous research works and by relevant standard ontologies in the field. Specifically, the ontologies presented by Cantale *et al.* (2017, 2021) are considered for the description of architectural types and components. Regarding objects, we model our ontologies by extending the Ontoceramic project (Cantone *et al.* 2015; Brancato *et al.* 2019a, 2019b). A similar approach is used for the characterization of religious iconography and funerary data (Fig. 3), where the EPIONT taxonomy is considered (Cantone *et al.* 2019). Finally, for the definition of an ontology concerning religious texts, we will take into account CRMtex, an extension of CIDOC CRM ontology formally representing the specific requirements of the studies in ancient texts, including papyrology, paleography, codicology and epigraphy (Felicetti, Murano 2017). While CIDOC is the actual standard for integrating cultural heritage data, other ontologies such as the ones provided by the Pleiades project for the historical toponymy, will be useful. The TGO (Fig. 4) will finally be endowed with a set of ontological primitives

to connect the four ontologies mentioned above, and to encompass the huge amount of digital and non-digital bibliography related to 'Godscapes'.

3. Objectives and anticipated results

Thanks to 'The Godscapes Ontology' the four types of data related to the material religiosity will be interconnected, while reasoning and semantic query will discover which exogenous elements transformed the indigenous forms of religious belief, and in which context these elements are especially recognizable. For example, when tomb types that are considered indigenous, as they have a long history of local development, are combined with burial containers that attest to new, exogenous traditions, such as anthropoid coffins of Egyptian style but local manufacture (Laneri, Pappalardo in press), or larnax of Late Minoan design (Gilmour 2002), the resulting funerary practice will be considered as hybrid. The same applies to the combination of all the components of the funerary context, such as grave goods and body treatments of different origin and influence. Thus, according to the 'material entanglement' definition by Stockhammer (2013), disentangling the cultural matrices that participated in the origin of new practices and craft traditions means acknowledging their contribution in forming a new material entity, whose significance and, in the case of death-related practices, related beliefs may not be a simple sum of its components, but a different and peculiar one.

Building on this theoretical and methodological framework, the aims of the 'Godscapes' project are three folded:

1. Create a coherent model of material religiosity that will be useful for the understanding of ancient Near Eastern societies, while also furnishing a tool to be implemented with other datasets;
2. Interpret the transformation of a polytheistic religion into a different form of religiosity as it is the Israelite monolatry through a clear and diachronic definition of how exogenous and indigenous elements interacted. At this stage a suite of SWRL rules is defined, describing interactions between relevant elements of material religiosity;
3. Make the project datasets open to the public through the use of 'open science practices' that will increase the quality and impact of Responsible Research & Innovation (RR&I).

Following these objectives, the anticipated outcomes of the 'Godscapes' research project include the creation of a suite of OWL 2 ontologies based on the vocabularies of religious materiality, and the implementation of an openly accessible database containing all pertinent datasets utilized in the project. The dataset will be accompanied by formalized SWRL rules and queries, in such a way as to characterize specific concepts on the one side and answer

research questions from the other. To enhance accessibility, and the sharing of fair and quality certified open data, a web platform and a webGIS interface are being developed to query and visualize the data in a user-friendly manner.

Nicola Laneri, Chiara Pappalardo
Dipartimento di Scienze Umanistiche
Università degli Studi di Catania
nlaneri@unict.it, chiara.pappalardo@unict.it

Marianna Nicolosi-Asmundo, Daniele Francesco Santamaria
Dipartimento di Matematica e Informatica
Università di Catania
marianna.nicolosiasmundo@unict.it, daniele.santamaria@unict.it

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REFERENCES

Berners-Lee T., Hendler J., Lassila O. 2001, *The Semantic Web*, «Scientific American», 284, 5, 34-43.

Brancato R., Nicolosi-Asmundo M., Pagano G., Santamaria D.F., Ucchino S. 2019a, *An ontology for legacy data on ancient ceramics of the plain of Catania*, in A. Casagrande, E. Omodeo (eds.), *Proceedings of the 34th Italian Conference on Computational Logic (Trieste 2019)*, CEUR-WS, 2396, 59-67.

Brancato R., Nicolosi-Asmundo M., Pagano G., Santamaria D.F., Ucchino S. 2019b, *Towards an ontology for investigating on archaeological Sicilian landscapes*, in C. Meghini, A. Poggi (eds.), *Proceedings of the 1st International Workshop on Open Data and Ontologies for Cultural Heritage 2019 (Rome 2019)*, CEUR-WS, 2375, 85-90.

Cantale C., Cantone D., Lupica Rinato M., Nicolosi-Asmundo M., Santamaria D.F., Stufano Melone M.R. 2021, *The ideal Benedictine monastery: From the Saint Gall map to ontologies*, «Applied Ontology», 16, 2, 137-160.

Cantale C., Cantone D., Nicolosi-Asmundo M., Santamaria D.F. 2017, *Distant reading through ontologies: The case study of Catania's benedictines monastery*, «Italian Journal of Library, Archives and Information Sciences», 8, 3, 203-219.

Cantone D., Nicolosi-Asmundo M., Santamaria D.F., Trapani F. 2015, *Ontoceramic: An OWL ontology for ceramics classification*, in D. Ancona, M. Maratea, V. Mascardi (eds.), *Proceedings of the 30th Italian Conference of Computational Logic (Genova 2015)*, CEUR-WS, 1459, 122-127.

Cantone D., Cristofaro S., Nicolosi-Asmundo M., Prado F., Santamaria D.F., Spampinato D. 2019, *An EpiDoc Ontological Perspective: The Epigraphs of the Castello Ursino Civic Museum of Catania via CIDOC CRM*, «Archeologia e Calcolatori», 30, 139-157 (https://doi.org/10.19282/ac.30.2019.10).

Felicetti A., Murano F. 2017, *Scripta manent: A CIDOC CRM semiotic reading of ancient texts*, «International Journal on Digital Libraries», 18, 4, 263-270.

Gilmour G. 2002, *Foreign burials in Late Bronze Age Palestine*, «Near Eastern Archaeology», 65, 2, 112-119.

Killebrew A.E. 2012, *Biblical peoples and ethnicity. An archaeological study of Egyptians, Canaanite, Philistines, and Early Israel 1300-1100 BCE*, «Society of Biblical Literature – Archaeology and Biblical Studies», 9.

Koch I. 2019, *Religion at Lachish under Egyptian colonialism*, «Die Welt Des Orients», 49, 2, 161-182.

Laneri N. 2024, *From Ritual to God in the Ancient Near East. Tracing the Origins of Religion*, Cambridge, Cambridge University Press.

Laneri N., Nicolosi-Asmundo M., Santamaria D.F., Pappalardo C. 2024, G*odscapes: modeling second millennium BCE polytheisms in the eastern Mediterranean thanks to the Storage project*, in A. Di Silvesto, D. Spampinato (eds.), *Me.Te. Digitali. Mediterraneo in rete tra testi e contesti, Proceedings XIII Convegno Annuale AIUCD (Catania 2024)*, 525-529 (poster).

Laneri N., Pappalardo C. in press, *Patterns of religiosity in the Levant and Egypt during the second millennium BCE: The case of the anthropoid clay coffins*, in *Studies in honour of Marilina Betrò*.

Oggiano I. 2005, *Dal terreno al divino: archeologia del culto nella Palestina del primo millennio*, Roma, Carocci.

Schulz S., Jansen, L. 2018, *Towards an ontology of religious and spiritual belief*, in S. Borgo *et al.* (eds.), *Proceedings of the 10th International Conference (FOIS 2018)*, Amsterdam, IOS Press, 253-260.

Smith M.S. 2001, *The Origins of Biblical Monotheism: Israel's Polytheistic Background and the Ugaritic Texts*, Oxford, Oxford University Press.

Staab S., Studer R. 2010, *Handbook on Ontologies*, Dordrecht, Springer Science & Business Media.

Stockhammer P.W. 2013, *From hybridity to entanglement, from essentialism to practice*, «Archaeological Review from Cambridge», 28, 1, 11-28.

ABSTRACT

'Godscapes' proposes to combine a material approach with the Semantic Web to investigate cultural transformation and, specifically, how external elements trigger the transformation of religiosity, resulting in new hybrid elements. Focusing on a case-study on the Levant during the second millennium BCE, the project investigates the interplay between indigenous and exogenous elements (Egyptian, Syrian, Mesopotamian, Aegean, Anatolian) in shaping polytheistic beliefs and practices through the analysis of four types of data – funerary, architectural, iconographic and textual. Thus, the project addresses a new scientific perspective emphasizing the use of material culture to understand the connection between humans and the divine. The focus is on the unravelling of past religious hybridization to grasp how the second millennium cultural and religious intermingling persisted in the syncretic experience leading to the construction of the Israelite monolatry in the first millennium BCE.