

New Technology Gives Earlier Dates for Dead Sea Scrolls, Challenging Doubts About Book of Daniel

While scholars have held the Dead Sea Scrolls to date somewhere between the fourth and second century BC, there has been considerable difficulty dating individual manuscripts with any degree of accuracy.

Now using AI technology and new radiocarbon dating carried out in cooperation with the Israel Antiquities Authority, there have been some surprises as the documents have been found to be older than assumed, according to a new study published in PLOS One June 25.

“The implications are profound,” enthused Maruf Dhali, assistant professor of AI at Groningen in the Netherlands and co-author of the study. “With empirical evidence now anchoring paleographic analysis, scholars can revisit longstanding questions about when particular biblical texts circulated – and how these scripts relate to political and cultural shifts in ancient Judea.”

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Previously, experts based their estimates primarily on the changes observed in text as the Hebrew script evolved over time, together with some limited carbon dating, leading to a broad scholarly consensus. However, in the paper entitled, “Dating ancient manuscripts using radiocarbon and AI-based writing style analysis,” the Dutch team of researchers headed by Prof. Mladen Popović candidly convey the limitations of the previous dating system:

“When we zoom into the specifics of the centuries in between, the finer typological and chronological distinctions – misleadingly connected with historical-political eras – are not reliably grounded in the data; rather, they rely on so-called absolute pegs that are not absolute at all and on unsubstantiated suppositions about historical processes that would have influenced palaeographic developments.”

“The main problem is that there is a paleographic gap between the third century BCE and the second century CE. There is a lack of absolute dates across the time period of the scrolls,” the paper clarifies.

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“There simply were no securely dated Hebrew or Aramaic manuscripts from the late Hellenistic era against which to compare,” Prof. Popović, director of the Qumran Institute at Groningen said in the Jerusalem Post, adding, “our approach bridges that gap by using 24 radiocarbon-anchored examples to give an objective timecode for handwriting styles.”

As part of the ongoing project, The Hands That Wrote the Bible funded by the European Research Council, a deep learning AI model nicknamed “Enoch” has been trained to recognize variations in ink trace patterns, shapes and styles, in combination with new radiocarbon results for a selection of manuscripts. Together with actual dates that were written as part of the text in some cases, Enoch has enabled more precise dating based on empirical data to within about 30 years.

The results could now change the way scholars see history. “This is very exciting because it changes the way we have to think about the community behind the Dead Sea Scrolls, the people who collected them, wrote them, read them,” Popović said. “It also changes how we think of the history of Judea.”

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The results also indicate literacy was more widespread than was previously assumed. "We can now see that an increase in literacy precedes the Hasmoneans," Popović added. "What does it mean? Someone else will need to think about it."

Importantly for Bible scholars, the dating of the books of Daniel and Ecclesiastes (Kohelet in Hebrew) were found to have been composed considerably earlier than previously thought.

"Most scholars agree that the second part of Daniel was composed during the Hasmonean revolt," said Prof. Eibert Tigchelaar, an expert in the Dead Sea Scrolls from the University of Leuven in Belgium. "The radiocarbon dating on the scroll determined that the scroll dated back to a period between 220-165 BCE, decades earlier than what the traditional paleography classification suggested."

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"This is the first tangible proof that portions of Daniel and Kohelet were penned contemporaneously with their presumed scribes," Popović announced. "It opens a window into the production of biblical literature at its very source."

In looking at the two manuscripts, 4Q114 and 4Q109 of Daniel and Ecclesiastes, Joe Uziel, head of the IAA Dead Sea Scrolls Unit, told The Times of Israel, "This means that these manuscripts are not just the earliest copy of these books that survived, but one of the earliest copies of these compositions ever written."

"This is also amazing in that the study provides a broad multidisciplinary approach, using both analytical and digital studies hand in hand to decipher new clues that the Dead Sea Scrolls hold in understanding past society – particularly in the days of the Second Temple Period when Jewish culture was

thriving and early Christianity was budding,” he added. “In that sense, I hope this trend continues to influence the field of Dead Sea Scrolls studies.”

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