Charleston, S.C. — Some scientists suggest it could be still one more sign of climate change: Salamanders in the Appalachian Mountains are getting smaller, they say, because in a drier, warmer climate, the little cold-blooded creatures use more energy to stay alive.

“As their temperature rises, all their physiological rates increase,” said Michael Sears, a Clemson University biologist. “All else being equal, that means there is less energy for growth.”

In a study earlier this year in the journal Global Change Biology, Sears and other researchers compared museum specimens of salamanders collected in the course of a half-century beginning in 1957 with those measured at the same sites in 2011 and 2012.

In all, they measured almost 9,500 adult salamanders and found their bodies were, on average, about 8 percent smaller after 1980 than in the earlier decades.

The change was not universal. While in six species salamanders were smaller, there was no change in eight other species, and salamanders in one species even increased in size. Samples were taken in Maryland,
“We point to climate change as our best guess of what we think is going on,” said Karen Lips, an associate professor in the University of Maryland’s Department of Biology and a co-author of the paper.

So if salamanders are smaller, why does it matter? It matters to the creatures throughout their forest habitat, Lips said.

“Because they are so abundant, they are a food source for birds, snakes and small mammals, things like raccoons, possums and shrews,” Lips said. If salamanders are smaller, “other animals will have to eat more, it will take them more time to find food, and life becomes more difficult for everybody.”

The study was also co-authored by Nicholas Caruso of the University of Alabama and Dean Adams of Iowa State University.

Ecologist and author Paul Ehrlich, a senior fellow at the Stanford Woods Institute for the Environment at Stanford University, said climate change might be to blame.

“The climate is changing more rapidly than we expected, and that’s a possible cause,” said Ehrlich, who did not work on the study. “But there’s a general loss of amphibians around the world with all kinds of reasons and all kinds of argument about it. Populations of amphibians are in bigger trouble than any other major group.”

And Kenneth Dodd, an associate professor in the Department of Wildlife Ecology and Conservation at the University of Florida who has worked in the Southern Appalachians for decades, has problems with the study, saying the data presented does not support the conclusion.

He said there could be other explanations, noting that balsam and fir forests in the higher elevations of the Great Smoky Mountains are dying because of the introduction of an exotic insect, not climate change. With the dying forests, the area becomes less cool and wet, affecting salamanders’ habitat.

“I could put forth a scenario that the change in body size, if it is valid, might be due to changes in forest composition or habitat changes which
have absolutely nothing to do with climate change,” he said. He also said that in some cases, very small samples of some species were measured.

The greatest variety of salamanders in the nation is found in the Southeast, with scientists having identified more than 100 species.

Smaller salamanders could be the result of individuals not growing as big, or genetic changes in which entire species are smaller in response to a changed environment, the study suggests.

“The rapidity and the widespread extent of these changes . . . may signal rapid adaptation to novel environmental conditions,” the paper said.

Smaller salamanders, like other small creatures, are at a disadvantage.

“One of the rules of biology or ecology is that bigger is better. If you’re a bigger animal, you are more likely to get a better mate, better territories and produce more offspring,” Lips said. “If you are smaller, everything can eat you.”

— Associated Press