mal in western and south-central Canada and perhaps the U.S. northern tier states.

La Niña may affect such matters of narrow interest as the Olympics, but it also may play a role in the trendiest climate topic of the moment, detecting the global greenhouse warming. James Hansen of the Goddard Institute for Space Research touched off the biggest climatological hullabaloo since the bitter winters of the 1970s when he testified on Capitol Hill in the midst of a searing drought that the greenhouse warming is here. He said the global warming since 1965 is statistically significant, which no researcher would argue with. He said the warming is consistent with models predicting the greenhouse warming, another undisputed fact. Then he concluded that "the global warming is now sufficiently large that we can ascribe with a high degree of confidence a cause and effect relationship to the greenhouse effect."

That is where most every climate researcher in the country draws the line. The size of the present warming is not a unique indicator of its cause at this point, they argue. Any number of climate-changing mechanisms could be at work, alone or in combination. Clearly, El Niño was behind the record warm years of 1987 and 1983 (*Science*, 13 May, p. 883). The first half of 1988 has been running at a record warm pace too, but then, as Kiladis notes, there is about a 6-month lag between a temperature switch in the tropical Pacific, and its effect on the global atmosphere. "It's almost certain," he says, "that in late 1988 and early 1989, the mean temperature of the tropics equatorward of a latitude of about 30° will be below normal." That area constitutes half the area of the globe. "Unless the tropics are offset by higher latitudes," says Kiladis, "the globe will be colder" this winter.

This La Niña, which is likely to continue into next spring, could at least temporarily return the globe to temperatures typical of the 1950s or even the 1920s. The last La Niña before the present one began in 1975. The last year the average global temperature was below the mean for the period 1940 to 1960 was 1976. The abrupt jump to the warmth of the 1980s came shortly thereafter. Whether La Niña's absence contributed to the global warming is unknown, but that is the sort of point that many climate researchers would like to make. It is too early, they say, to be so certain about such a poorly understood phenomenon as global climate.

■ RICHARD A. KERR

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Superconductivity Result Unconfirmed

Several American laboratories are trying to reproduce the work of a group of Taiwanese researchers who say they have made a material that becomes superconducting at a record 162 K, but so far no one has announced a confirmation.

Scientists at the Materials Research Laboratory in Taiwan say they have produced a thallium-calcium-barium-copper-oxygen compound that loses all resistance to electricity at 162 K. If true, that would be 37 K warmer than the previous best superconductor, which contains the same elements but apparently with a different composition. It has been at least a month, however, since word of the Taiwanese result began to spread through the superconductivity community, and so far no second group has announced it has seen the same phenomenon, even though the Taiwanese scientists have made their synthesizing process available to other labs.

Paul Grant at the IBM Almaden Research Center said researchers at IBM have known about the result for about a month and have tried without success to reproduce it. His group has talked with the Taiwanese scientists and has followed their recipe for the material, he said, but they have only gotten superconductivity at 110 to 120 K. This is no better than has already been done with thallium-based superconductors, which have the highest critical temperature to date, at 125 K.

The Taiwanese scientists speculate they may have found the predicted "four-layer phase" of the thallium system of superconductors. The crystalline structures of these superconductors depend sensitively on the proportions of different elements in the starting composition as well as on the processing conditions, and various thallium-based superconductors have been discovered with different structures. So far, these thallium-based superconductors have all had certain features in common, including having layers of CuO_2 lying between layers of thallium. (All of the materials discovered so far that become superconducting at higher than 77 K, not just the thallium materials, have layered crystalline structures. Scientists speculate that these layers play a major—although still undetermined—role in high-temperature superconductivity.)

The critical temperatures of the different thallium superconductors seem to depend on the number of CuO_2 layers. For instance, the materials with 125 K critical temperature have three CuO_2 layers interspersed between their thallium layers; compounds with two layers have critical temperatures of about 110 K; and compounds with only one layer become superconducting at no higher than 80 K. Some scientists have suggested that the critical temperature could be increased by fabricating a thallium-based compound with four, five, or more CuO_2 layers.

The Taiwan group said its 162 K material seems to have chemical composition $TlCa_2Ba_3Cu_4O_x$ and to have four CuO_2 layers between the thallium layers. The researchers cannot be completely sure of this composition, though, because their samples contain a number of different materials that have not been separated. The tentative identification of the structure is based on circumstantial evidence—in each sample over 140 K that the group examined with an electron microscope, they found this four-layer structure.

Results from other labs, however, raise doubts about this reported four-layer structure, as well as about whether it could produce 162 K superconductivity. "When we follow their synthetic procedure, we don't get a four-layer compound," Grant said. Two groups that have recently reported synthesizing four-layer thallium compounds say they found the critical temperature to be less than 125 K. One of the groups reports preparing the same $TlCa_2Ba_3Cu_4O_x$ composition as the Taiwan team, but that group measured only a 122 K critical temperature.

Although Grant said his team still takes the Taiwan result seriously, the inability so far to reproduce those results does raise questions. Early this year, when two new classes of superconductors were discovered, laboratories all over the world reproduced the results in a matter of days—or hours in some cases. For instance, after Allen Hermann at the University of Arkansas discovered the first thallium-based superconductors in February, researchers at IBM reproduced the results within 24 hours of receiving information on the structure of the new material. "A real result is instantly reproducible at a number of locations, even if that result is very transitory," Grant said. "A month is a long time [to go without reproducing a result]."

■ ROBERT POOL

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