

ASTRONOMY

Antarctica a perfect spot for watching stars' births

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In February, it's summer at the South Pole, yet the average temperature is 35 below zero. Professional astronomers take advantage of the still, dry air of Antarctica in summer to make observations using novel telescopes.

One telescope at the South Pole detects infrared light, which is used to study star-forming regions in our galaxy. New stars are constantly being born out of the gas clouds left over from supernova explosions and other sources.

The dust filters out visible light, but infrared light gets through and gives a unique signature of newly formed stars.

The main advantage of Antarctica is its stable atmosphere. Studies over the past 30 years show that its atmosphere has extremely low humidity. Water vapor absorbs microwaves and infrared wavelengths, so the South Pole is an ideal place for observing these wavelengths.

The question of how many new stars form each year has importance, for example, to the SETI project (search for extraterrestrial intelligence). Some stars burn out or explode each year, and likewise new stars are being born.

If life exists somewhere in the galaxy, then the Drake equation suggests that the probability of finding it is proportional to the rate of star formation.

Of course, the rate is of interest in its own right. Understanding the conditions of how stars are born also tells us about the origins of our solar system.

Another "telescope" at Antarctica is submerged hundreds of feet below the ice and looks at particles called neutrinos. The AMANDA project is a precursor to IceCube, which, when built, will have detectors that span almost a cubic mile of ice. That's one big cube!

Although IceCube is not traditional astronomy, it opens a new frontier to science — neutrino astronomy. Neutrinos are emitted in huge quantities by supernova explosions and other highenergy sources.

IceCube will give new information on sources of neutrinos, perhaps helping physicists understand the inner dynamics of supernovae.

History shows that each time a new type of telescope is developed, unexpected discoveries are made. The South Pole telescopes could be another step in this direction.

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