Will it be third time lucky for Europe's climate satellite?

April 7 2010

A picture released by the European Space Agency (ESA) shows an artist impression of the European CyroSat satellite. After losing one satellite and postponing the launch of its replacement, European scientists hope Thursday will yield good news in their quest to get a revolutionary climate monitor into orbit.

After losing one satellite and postponing the launch of its replacement, European scientists hope Thursday will yield good news in their quest to get a revolutionary climate monitor into orbit.

Their watchdog is the 700-kilo (1,540-pound) CryoSat-2, the most powerful satellite ever built for measuring the thickness of Earth's icesheets.

For climate physicists, ice cover is like a canary in the coal mine, providing invaluable early warning of the impacts of man-made temperature rise.

Over the past decade, mounting evidence points to the loss of floating summer sea ice in the Arctic and the breakup of large banks of ice on the Antarctic peninsula as global warming has intensified.

But much remains unknown, especially the health of the Greenland and Antarctic land ice sheets, where the bulk of the planet's freshwater is locked up.

Even a small melt from these mighty frozen reservoirs could drive up sea levels sufficiently to drown many coastal cities and deltas.

The big tool for measuring the ice is CryoSat-2's specially-designed all-weather microwave radar altimeter, capable of detecting changes in ice thickness to within one centimetre (0.4 of an inch).

Scientists have gnashed their teeth in frustration over the years lost between since CryoSat's conception and Thursday's launch from Russia's Baikonur Cosmodrome in Kazakhstan.

"In the period between proposing CryoSat in 1999, the Arctic ice decline has become a fact, rather than a prediction," says Duncan Wingham, a British scientist who is the project's lead investigator.

"On the other hand, the ice decline is more rapid than any model prediction. Clearly we need to understand in much greater detail the behaviour of the ice."

In addition, the decline in the ice opens the Arctic Ocean to the action of the winds.

That means surface currents may alter, boosting the possible effects on the North Atlantic, says Wingham, a professor of earth sciences at University College London.

The first CryoSat was destroyed in a second-stage launch failure in October 2005 that used a modified Russian SS-19 intercontinental ballistic missile (ICBM).

Its replacement also uses a converted ICBM, a three-stage derivation of an SS-18 called the Dnepr.

The replica's launch had been originally set for February 25, but was postponed because of worries -- since discounted -- that the second-stage engine's fuel reserve was insufficient.

Launch teams on Tuesday carried out a successful eight-hour dress rehearsal, the European Space Agency (ESA) said in a press release.

CryoSat-2 will be the third of ESA's "Earth Explorer" satellites.

The others are GOCE, launched in March 2009 to monitor ocean circulation, and SMOS, launched in November 2009 to monitor soil moisture and ocean salinity.

Liftoff on Thursday is scheduled for 1357 GMT.