

## PROPOSAL: Douglas Fox

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### **WHERE RIVERS RUN UPHILL:**

**I will accompany a 3-week expedition to the remote West Antarctic Ice Sheet to investigate how the largest ice mass on Earth is responding to climate change—and what its risks are for future collapse.**

There is a place here on Earth where water does strange things. As though it has a mind of its own, it spurts from one lake to another, and back again—sometimes it actually flows uphill to jump from one valley to another. If it were just a few teaspoons of water, it might be dismissed as a fluke. But it's not mere teaspoons. Instead, entire lakes of water—cubic miles of it—behave this way.

Everywhere else on Earth, water obeys one cosmic principle—gravity—which guides it from snowmelt high in the mountains to oceans hundreds of miles away. But in this place, water bows and bends to the demands of different god—pressure: thousands of pounds of pressure per square inch, forcing water, sometimes, to run uphill.

The place where this happens is Antarctica. Ninety-nine percent of the continent is shrouded in ice sheets up to 14,000 feet thick. Hidden beneath that ice are entire ranges of mountains, as high as 9,000 feet, that human eyes have never seen (their existence is known only from ice-penetrating radar).

But scientists are especially interested in the layer of liquid water that lies between the ice and the rocky continent below. They now believe that an entire system of rivers and lakes lies hidden below the ice, with water constantly shifting this way and that in response to pressures from the mile-thick ice above.

Scientists believe that this water's behavior will help determine how the effects of climate change—especially sea level rise—are felt around the world. The water lubricates the movement of vast swaths of ice sheet over Antarctica's rocky surface. This allows some parts of the ice sheet—so-called “ice streams” that are 50 miles wide, hundreds of miles long, and thousands of feet deep—to slip toward the ocean 100 times more quickly than others parts of the ice sheet. Changes in this lubricating layer—which scientists are currently observing—are altering the flow of these ice streams. It could threaten the stability of large ice shelves that hang off the edge of the continent and float on the ocean.

Researchers were shocked to observe the breakup of one small ice shelf during 35 days in 2002—the Larsen B Ice Shelf, which was larger than Rhode Island and contained 350 cubic miles of ice. Disintegration of larger ice shelves, like the Ross Ice Shelf could in turn lead to rapid loss of coastal parts of the massive West Antarctic Ice Sheet, which alone contains enough water to raise the world's sea level by 15 feet.

**This November I will accompany a research expedition to a remote field site on the West Antarctic Ice Sheet to investigate what is happening below the ice sheet—and what the implications are for the rest of the world.**

**See page 2 for details of field reporting.**

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## **On-Site Reporting: West Antarctic Ice Sheet**

**This November, I will accompany a research expedition to the edge of the West Antarctic Ice Sheet, where the Whillans Ice Stream, a 2,500-foot-thick conveyor belt of ice, feeds into the Ross Ice Shelf.**

**This location has rarely, if ever, been visited by humans. However, it became an area of intense interest following the March 2007 discovery of a network of lakes below the ice.** The lakes were discovered by scientists analyzing satellite laser altimeter data (scientists located the lakes by measuring local rises and falls in the ice sheet as a mass of water, amounting several cubic kilometers of water, shifted below the ice from one lake to another).

**I will camp on the West Antarctic Ice Sheet for 2-3 weeks, together with a team of 3 scientists (a ski-mounted Air Force Twin Otter airplane will ferry us to this remote field site).** I will observe first-hand as the team uses ice-penetrating radar to examine the topography of lakes, and will watch as the team places instruments that will track movement of the Whillans Ice Stream for several years to come (and estimate the volume of water flowing beneath it). As we visit different locations on the Whillans Ice Stream, **we will travel by snowmobile, covering 100 miles per day (towing a sled of survival gear and research equipment behind each snowmobile).**

**My reporting will extend over the entire trip—Nov 10 to Dec 20—and will include ~10 days in McMurdo Station (the main U.S. outpost in Antarctica) where I will make contacts with researchers from other expeditions and undergo training, including crevasse rescue, before departing for the remote field site.** I will take hundreds of digital photographs and make many hours of voice and sound recordings (with the goal that some recordings will be broadcast quality). I will also conduct background reporting before departing on the trip, including one or more visits to the laboratory of Slawek Tulaczyk, the UC-Santa Cruz glaciologist who is leading the expedition, and interviews with other scientists studying the Whillans Ice Stream and West Antarctic Ice Sheet.

**The story will weave together day-to-day realities of research on remote Antarctic ice sheets with broader questions of ice sheet stability, and implications for climate change and sea level rise.**

## **Travel / Reporting Itinerary: Nov 10 – Dec 20, 2007**

- Travel to the International Antarctic Centre (Christchurch, New Zealand) for survival equipment outfitting.
- Spend 7-10 days in McMurdo Research Station on the coast of Antarctica for orientation and survival training (crevasse rescue, etc)...
  - Significant opportunity for reporting on other expeditions transiting through this bustling town.
- Fly by Hercules military transport plane to the West Antarctic Ice Sheet (WAIS) Divide airstrip, an expedition staging site.
- Fly by Twin Otter aircraft to our field site on the WAIS / Whillans ice sheet.
  - Camp for 2-3 weeks on the ice sheet.
- Return home via WAIS Divide, McMurdo, Christchurch.