NASA Home/Missions Web Site

http://www.nasa.gov/mission_pages/arctas/smoke_plumes.html
Forest Fire Smoke Plumes Probed
07.03.08

 An instrument from the National Center for Atmospheric Research collects data from a smoke plume generated by a forest fire over Canada on July 1, 2008. Credit: NASA

> Larger image In a nondescript room on a Canadian Air Force Base, an international team of fire trackers, weather forecasters and various atmospheric scientists puzzle over computer models, satellite tracks and flight charts. Their goal is to find the best fire targets and tailor the flight path of NASA's airborne laboratories to track and investigate the properties of smoke plumes.

The researchers are part of the summer deployment of NASA's Arctic Research of the Composition of the Troposphere from Aircraft and Satellites, or ARCTAS, mission. The mission is just five days into its summer study of the smoke plumes from northern latitude forest fires, and already the choreographed effort between modelers and experimenters is producing a wealth of new data.

"Given the vagaries of plume timing and location, the presence of clouds, and coordinating with satellite overpasses, the mission is coming together very well," says Jim Crawford, manager of the Tropospheric Chemistry Program at NASA Headquarters in Washington who is on-location for the mission.

As expected in the height of fire season, Canada is turning up some fires worthy of aerial investigation. Almost daily, scientists and crew are flying from either the 4 Wing Air Force Base in Cold Lake, Alberta, on NASA's DC-8 and P-3B aircraft, or from Yellowknife, Northwest Territories, on NASA's B-200.

Instruments on the aircraft have sniffed the presence of smoke over Canada from distant fires in Siberia and California. But instruments are also busy sampling smoke plumes from fires originating in northern Canada, characterizing their chemical components and other physical properties. Flight paths, often adjusted on the fly to accommodate Mother Nature, have allowed scientists to collect this data from around and downwind of plumes of all sizes.


University of Toronto and Pennsylvania State University researchers prepare to launch a balloon from Yellowknife, Northwest Territories, to collect weather and ozone data. Credit: Greg Merkes/NASA
> Larger image With the samples collected close to the source and downwind, researchers hope to learn how the plumes age over time. They can also examine the plume's movement, both horizontally across the landscape and vertically into the atmosphere. Satellites have recently shown smoke plumes reaching higher into the atmosphere than previously thought possible, and now, aircraft will help confirm what satellites observed and improve future model predictions.

If models are correct, weather and fire conditions should culminate into a fury of activity on the Fourth of July, creating their own type of atmospheric "fireworks". Specifically, researchers are hoping to spot the infamous pyrocumulus plume. Under atmospheric conditions similar to those that generate thunder storms, this type of plume can loft particles high into the upper atmosphere. The particles can then jet around the globe carried by high wind speeds and remain at altitude for an extended period, potentially impacting climate.

Kathryn Hansen
Goddard Space Flight Center

http://www.nasa.gov/mission_pages/arctas/arctas_update20080703.html
ARCTAS Mission Status Update, July 3, 2008
07.03.08

 The chemical and particulate composition of the smoke plume from this boreal forest fire near Ft. McMurry in northern Alberta was the subject of an aerial study by ARCTAS mission scientists aboard NASA's DC-8 and P-3 science aircraft on July 1. NASA Photo. While most citizens of the United States are celebrating the nation's independence during the July 4th weekend, more than 100 scientists, flight crew and mission support personnel from NASA and a variety of universities and government research agencies are working in northern Canada, gathering data in the second phase of the Arctic Research of the Composition of the Troposphere from Aircraft and Satellites – or ARCTAS – field campaign.

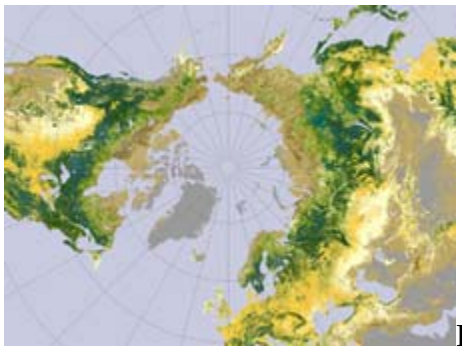
A flight of two NASA science laboratory aircraft, a modified DC-8 from the Dryden Flight Research Center in Southern California and a P-3 from the Wallops Flight Facility in Maryland, was scheduled on Friday, July 4 that would collect data while flying under Earth-monitoring satellites for data comparison.

During an eight-hour flight July 1, NASA's DC-8 airborne lab sought out forest fire smoke plumes and forest fire-produced cumulo-nimbus events while sophisticated instruments mounted on the aircraft collected data to determine the composition of particulate matter in those plumes. After locating a fire, the aircraft then flew patterns at several altitudes around the fire and at various points downwind s far as 375 nautical miles from fire's point of origin. After back tracking up this same fire's smoke plume, similar patterns were repeated from the fire's point of origin downwind for several hundred nautical miles.

Both four-engine aircraft are deployed out of a Canadian Forces air base at Cold Lake, Alberta during the campaign, while a third NASA aircraft, a B-200 King Air from Langley Research Center, Virginia, is flying out of Yellow Knife, Northwest Territories.

The ARCTAS investigation is intended to improve understanding of how the composition of the Arctic atmosphere is influenced by long-range transport of pollution from lower latitudes and local emissions from boreal wildfires and their impact on Arctic quality and climate. Validation of the NASA satellites that continuously monitor the global atmosphere is also a major focus of this mission.

http://www.nasa.gov/mission_pages/arctas/summer_deploy.html
NASA Aircraft Examine Impact of Forest Fires on Arctic Climate
06.12.08


Boreal forests, depicted here in dark green, host an increasing number of forests fires. Their smoke plumes are the focus of observations during NASA's ARCTAS mission. **Credit:** NASA's Earth Observatory
> Larger image As the summer fire season heats up, NASA aircraft are set to follow the trail of smoke plumes from some of Earth's northernmost forest fires, examining their contribution to arctic pollution and implications for climate change.

Starting June 29, NASA's DC-8 and P-3B aircraft, based at a Canadian military base in Cold Lake, Alberta, will begin their final three-week deployment of the Arctic Research of the Composition of the Troposphere from Aircraft and Satellites, or ARCTAS, mission. A third NASA aircraft, the B-200 King Air, will fly from Yellowknife, Canada. The mission is the most extensive field campaign ever to study the chemistry of the Arctic's lower atmosphere. The three airborne laboratories are equipped to fly through the smoke plumes of northern-latitude forest fires. The resulting data, when combined with simultaneous satellite measurements, could reveal the impact of forest fires on the arctic atmosphere.

"The summer campaign will focus on boreal forest fire emissions," said Jim Crawford, manager of the Tropospheric Chemistry Program at NASA Headquarters in Washington. "Coupled with the observations of arctic haze during the spring deployment based in Alaska, these data will improve our understanding of the relative importance of these two influences on arctic atmospheric composition and climate."


The MODIS instrument on NASA's Terra satellite observed dense smoke plumes in Manitoba, Canada on May 29, 2008. **Credit:** NASA/NOAA

> Larger image
> Labeled image Boreal forests, which span Earth's northern latitudes, have seen a rise in natural forest fires during the last decade. Researchers have debated the degree to which these fires contribute to the Arctic's atmosphere compared to other sources, such as human-caused emissions from lower latitudes. The ARCTAS flights through smoke plumes, over and downwind from their source, will reveal their composition and transport path.

Researchers also will use the data to examine how the chemistry of smoke plumes changes over time and distance. Plume chemistry can contribute to the formation of ozone in the lower atmosphere. Particulates in smoke plumes can affect Earth's radiation balance with consequences for climate change.

The mission also is expected to help researchers interpret data from NASA satellites orbiting over the Arctic. NASA's Cloud-Aerosol Lidar and Infrared Pathfinder Satellite Observation, or CALIPSO, satellite can measure the height of various plume components in the atmosphere, information critical to predicting plume movement. Researchers will use data from ARCTAS to validate observations from CALIPSO and other satellites to improve model predictions of fire impacts on chemistry and climate.

"Aircraft experiments provide the greatest possible detail on the state of the atmosphere, but only for short, intense periods of sampling," Crawford said. "By conducting these flights in tight coordination with satellites and computer models, airborne observations lead to improvements in the interpretation of satellite observations and better representation of atmospheric processes in chemistry and climate models. This improves our confidence in models' ability to monitor and predict future changes."

The Yellowknife site also will host a portable science station from Pennsylvania State University that collects ground-based ozone and aerosol measurements, in conjunction with daily launches of balloon-borne instruments planned by Environment Canada and the National Oceanic and Atmospheric Administration.

The ARCTAS flights are being coordinated with research flights from Kangerlussuaq, Greenland being conducted by the Centre National de la Recherche Scientifique -- a French government-funded research organization -- and the German Aerospace Center.

The summer deployment of ARCTAS follows a spring deployment based in Fairbanks, Alaska. That mission focused on atmospheric composition, pollution transport pathways, and the formation of "arctic haze," which is fueled by sunlight that causes chemical reactions in pollutants that accumulate over the winter.

Kathryn Hansen
NASA's Goddard Space Flight Center

http://www.nasa.gov/topics/earth/features/08-048_arctas.html
NASA Web Tool Enhances Airborne Earth Science Mission
04.24.08


NASA research scientist Richard Blakeslee, a developer of the Real Time Mission Monitor, performs a preflight system check-out aboard the DC-8. Image credit: NASA/MSFC

What if you were embarking on a road trip and you had an on-board tool, complete with video screen, that let you view your projected route, real-time traffic information and current weather, at any time during the journey? Not only that, but friends and family anywhere else in the world could follow your progress on a home computer. Sound good?

NASA scientists flying over the Arctic this month on the largest airborne experiment ever to study the role of air pollution in that region had such a tool at their disposal. The Real Time Mission Monitor, developed by NASA researchers, assembles the data from all the research satellites, aircraft and surface sensors and displays the "big picture," overlaid on Google Earth, for the whole team of scientists to view at the same time anywhere during the live mission.

This is the third and most complex test-drive for the monitor. The web-based system was first tested in 2006 to help look for clues about conditions that foster hurricane development off the coast of Africa. Last year, the monitor got another shakedown during NASA's airborne mission studying tropical weather conditions over Costa Rica.

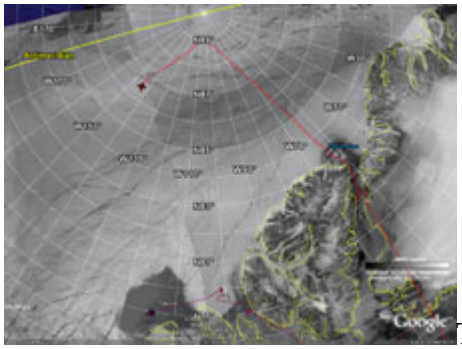
Now, scientists hard at work on the NASA Arctic Research of the Composition of the Troposphere from Aircraft and Satellites mission, or ARCTAS, have used the Real Time Mission Monitor to help them conduct their field operations.

The ARCTAS campaign includes two aircraft deployments, each three weeks in duration, in spring and summer 2008. The ARCTAS spring deployment, which ended April 20 in Fairbanks, Alaska, gathered critical information about the effects of arctic haze, stratosphere-troposphere exchange, and sunrise photochemistry. The summer deployment, scheduled for June 26 to July 14 in Cold Lake, Alberta, will investigate how local emissions from northern forest wildfires affect the composition of the Arctic atmosphere.

ARCTAS scientists want to know why the Arctic environment has been rapidly changing. From vantage points aboard NASA aircraft, they will take a look at the dynamics and effects of pollution transported to and around the region. Information gathered from the

aircraft will help validate critical NASA satellite data and provide clues about phenomena like the recent decline of Arctic sea ice.

"For this experiment, having current information on where clouds and pollution plumes are occurring in the atmosphere can greatly improve science measurements," says senior research scientist Richard Blakeslee of Marshall Space Flight Center, a developer of the Real Time Mission Monitor. "Because the monitor combines displays of the positions and tracks of all the mission aircraft with near-real-time satellite imagery, model forecasts of aerosols and pollution, and research satellite overpass predictions, it helps the science team make urgent decisions about where exactly to fly to get the best measurements."



The NASA DC8 (near North Pole) and P3 (northern Canada) observe and sample the Arctic atmospheric composition on 9 April 2008 during return flights to Fairbanks, Alaska from Thule, Greenland. MODIS satellite infrared composite images help guide aircraft over the Arctic Ocean. Image credit: NASA/MSFC
"The Real Time Mission Monitor was very useful last week when high winds caused the DC-8 flight to divert from Thule, Greenland, to Iqaluit, Canada," said James Crawford, ARCTAS program manager. "At first, the primary concern of the pilots was getting to Iqaluit. However, the ability to monitor the situation allowed the mission planners time to re-consult satellite observations and model forecasts, leading to the decision to direct the DC-8 toward a hotspot of bromine radicals observed by NASA’s Aura satellite, a chemical associated with ozone depletion. A low pass with the aircraft over the area of interest was possible before landing in the new location."

The integration and delivery of this kind of information is made possible through data acquisition systems, network communication links and network server resources developed and managed by researchers at the National Space Science and Technology Center (NSSTC) in Huntsville, Ala., and NASA's Dryden Flight Research Center in Edwards, Calif. The NSSTC is a joint research facility managed by NASA's Marshall Space Flight Center in Huntsville and seven Alabama research universities.

"The value of network communications for airborne science operations cannot be underestimated," says Larry Freudinger, Dryden project lead for developing system components that provide communication and computing services between the aircraft and the ground. "The Real Time Mission Monitor gives the researcher intuitive, browsable views into a distributed web of dynamic data sources and processing components. The network is the instrument by which collective observations morph into timely decisions

that improve productivity."

The network also is enhancing mission operations in other ways. In addition to the Real Time Mission Monitor display, scientists and mission managers anywhere on the ground or in the air can communicate using an integrated instant messaging and voice communication service linked to the monitor.

The network in this case starts with gateways that use the Iridium satellite constellation to enable anywhere, anytime connectivity with each aircraft, which has multiple satellite links for improved bandwidth and reliability. The ground station at Dryden provides Internet access for the aircraft, while servers at Marshall gather satellite imagery, weather and atmospheric chemistry forecast models and any other elements needed for the ARCTAS Real Time Mission Monitor. Each airplane similarly has a set of servers to support data management, communication and applications used by onboard instrument teams.

Watch a time-lapsed movie of the Real Time Mission Monitor in action during ARCTAS:
Windows (streaming)
Real (streaming)

More information:
http://www.espo.nasa.gov/arctas/
http://rtmm.nsstc.nasa.gov/current_missions.html

List of participants:
http://www.espo.nasa.gov/arctas/participants.php

Credit: Jennifer Morcone/Dauna Coulter
NASA's Marshall Space Flight Center

Media Hits
ARCTAS, Summer Deployment
Updated July 23, 2008

Prepared by Kathryn Hansen
NASA Earth Science News Team
301-352-4638 / khansen@sesda2.com

1. **THE COLD LAKE SUN**
   http://cgi.bowesonline.com/pedro.php?id=14&x=story&xid=404820

The Cold Lake Sun

MAXIMIZE YOUR ADVERTISIN
THIS SPACE AVA
CALL TODAY 780-

July 22, 2008

News
Sports
Entertainment
Opinion
Letters to the Editor
Archives

Classifieds
Career Ads
Cybersaver
Contact Us
Privacy Policy

Featured Links
City of Cold Lake
Bowes Publishers
Sun Media
Quebecor Media

Don't miss this week's ads!

NASA scientists studying effects of Boreal forest fires

Tracy Dermott
Tuesday June 03, 2008

The effect of Boreal forest fires on Arctic ice is just one of the things a team of scientists from NASA will be studying while in Cold Lake June 26 to July 14.
The ARCTAS (Arctic Research of the Composition of the Troposphere from Aircraft and Satellites) mission is an arm of the POLARCAT (Polar study using Aircraft, Remote sensing, surface measurements and modelling of Climate, chemistry, Aerosols and Transport) project.
The mission team will be testing a number of things including aerosol, radiation, cloud, surface reflectance, and IR irradiance using two planes -- a DC-8 and B-200.
According to Kathryn Hansen, a science writer with the NASA Earth Science News Team, flights could begin as soon as June 29.
"They'll be flying downwind of Boreal forest fire plumes," she said in a phone interview last week.

The stop in Cold Lake is the second leg of the mission -- the first was in Fairbanks, Alaska.
Dr. Hanwant Singh who is with the NASA Ames Research Centre said the timing of the mission revolves around the typical, traditional forest fire season.
In an email from Singh, he said Cold Lake was chosen due to its proximity to the Boreal fires. There will be a second station set up in Yellowknife for scientists to keep an eye on the northern end of the fires.
Singh also wrote the mission and the fires are all tied into global warming.
"Many of the gases and aerosols (e.g. black carbon) are linked with radiation balances directly and directly," he wrote. "Some of these emissions change ice albedo over the Arctic as well as cloud absorption."
According to the ARCTAS website, there will up to eight flights out of Cold Lake while the team from NASA is here. Singh estimates the mission will bring about 200 people into the city.
For more information on ARCTAS, visit www.nasa.gov/mission_pages/arctas/.

NASA scientists studying effects of Boreal forest fires

Tracy Dermott
Tuesday June 03, 2008

The effect of Boreal forest fires on Arctic ice is just one of the things a team of scientists from NASA will be studying while in Cold Lake June 26 to July 14.
The ARCTAS (Arctic Research of the Composition of the Troposphere from Aircraft and Satellites) mission is an arm of the POLARCAT (Polar study using Aircraft, Remote sensing, surface measurements and modelling of Climate, chemistry, Aerosols and Transport) project.

The mission team will be testing a number of things including aerosol, radiation, cloud, surface reflectance, and IR irradiance using two planes -- a DC-8 and B-200.
According to Kathryn Hansen, a science writer with the NASA Earth Science News Team, flights could begin as soon as June 29.

"They'll be flying downwind of Boreal forest fire plumes," she said in a phone interview last week.

The stop in Cold Lake is the second leg of the mission -- the first was in Fairbanks, Alaska.

Dr. Hanwant Singh who is with the NASA Ames Research Centre said the timing of the mission revolves around the typical, traditional forest fire season.
In an email from Singh, he said Cold Lake was chosen due to its proximity to the Boreal fires. There will be a second station set up in Yellowknife for scientists to keep an eye on the northern end of the fires.

Singh also wrote the mission and the fires are all tied into global warming.
"Many of the gases and aerosols (e.g. black carbon) are linked with radiation balances directly and directly," he wrote. "Some of these emissions change ice albedo over the Arctic as well as cloud absorption."

According to the ARCTAS website, there will up to eight flights out of Cold Lake while the team from NASA is here. Singh estimates the mission will bring about 200 people into the city.

For more information on ARCTAS, visit www.nasa.gov/mission_pages/arctas/.

2. CBC NEWS
http://www.cbc.ca/canada/north/story/2008/06/17/boreal-fires.html

CBCnews.ca

Home World Canada Health Arts & Entertainment Technology & Science Money Consumer Life
British Columbia Calgary Edmonton Manitoba Montreal N.B. N.L. North N.S. Ottawa P.E.I.

Story Tools: E-MAIL | PRINT | Text Size: S M L XL | REPORT TYPO | SEND YOUR FEEDBACK

NASA study targets northern forest fires

Last Updated: Tuesday, June 17, 2008 | 9:50 AM CT Comments 4 Recommend 7
CBC News

The U.S. space agency is set to launch a three-week study into how fires in Canada's boreal forest contribute to Arctic pollution and affect climate change.

Using satellites, ground observations and high-tech aircraft, NASA will track smoke from fires in the Northwest Territories, the Yukon and the three Prairie provinces to better understand the impact on the North, said NASA scientist Hanwant Singh.

"We're also interested in how these emissions from these fires, how they come out, what they contain and how they're transported," Singh said.

With the number of forest fires on the rise, the information from the study is critical, said Brian Stocks, a Canadian forest fire expert who is helping with the project.

For example, soot from forest fires can contribute to the melting of glaciers, sea ice and permafrost, he said.

"With more forest fires in the boreal zone projected, as a major impact of climate change, we're looking at more smoke in the future in that area," Stocks said. "So trying to get a handle on just how it affects snow melt gives us a better idea of the pace at which climate change impacts are going to occur in the Arctic."

More than 100 people will be stationed at the Canadian military based in Cold Lake, Alta., and another dozen will work out of Yellowknife during the course of the study which begins June 29.

NASA study targets northern forest fires

Last Updated: Tuesday, June 17, 2008 | 9:50 AM CT Comments4Recommend6
CBC News

The U.S. space agency is set to launch a three-week study into how fires in Canada's boreal forest contribute to Arctic pollution and affect climate change.

Using satellites, ground observations and high-tech aircraft, NASA will track smoke from fires in the Northwest Territories, the Yukon and the three Prairie provinces to better understand the impact on the North, said NASA scientist Hanwant Singh.

"We're also interested in how these emissions from these fires, how they come out, what they contain and how they're transported," Singh said.

With the number of forest fires on the rise, the information from the study is critical, said Brian Stocks, a Canadian forest fire expert who is helping with the project.

For example, soot from forest fires can contribute to the melting of glaciers, sea ice and permafrost, he said.

"With more forest fires in the boreal zone projected, as a major impact of climate change, we're looking at more smoke in the future in that area," Stocks said. "So trying to get a handle on just how it affects snow melt gives us a better idea of the pace at which climate change impacts are going to occur in the Arctic."

More than 100 people will be stationed at the Canadian military based in Cold Lake, Alta., and another dozen will work out of Yellowknife during the course of the study which begins June 29.

3. THE COURIER
http://www.thecouriernewspaper.ca/30%20June%202008.pdf

Page 6 The Courier News & Publishing Tuesday, 30 June 2008

NASA Scientists Conducting Research At 4 Wing

CAITLIN EMOND

The name of the project is Arctic Research of the Composition of the Troposphere from Aircraft and Satellites... or ARCTAS for short.

Last Thursday saw the arrival of approximately 100 NASA scientists, bringing the total number of personnel to 150. The advanced party (managers and support personnel) arrived on June 18, to begin preparations for the research project, and the entire party will be in Cold Lake until July 12.

So what, exactly, is the mission for project ARCTAS? Well, to begin...

Global warming has been on the prowl for the last century, particularly in the arctic where it has been accelerating over the last few decades. The many pollutants are transported to the arctic, including CO, Mercury and aerosols (soot and other particulate), which create an "arctic haze".

The arctic is also being affected by the "emissions from massive forest fires in boreal Eurasia and North America," making the need for research, to better understand the effects of natural versus man-made emissions on northern climate. Which is why NASA undertakes projects like ARCTAS. They have been collecting data for various projects for over a decade.

"This is a long process that can take up to several years," says Mike Gaunce, engineer, and project manager for ARCTAS. When he begins to describe how data is collected, it starts to sound a bit like a science fiction novel.

The aircraft carry remote sensing instruments that "shoot lasers up and down" in order to map curtains of ozone concentrations. They also make measurements "in situ" (latin for 'in the place') by drawing air samples into the aircraft for analysis directly on board... it's enough to make your head spin.

The scientists working on this project come from all over the world – the US, Europe, Japan, England and Canada – and they are lucky to have the opportunity to travel the world conducting research. In 2006, Gaunce was in Cape Verde, Africa, and there have been missions in Costa Rica, Chile, Sweden and Canada, just to name a few.

Scientist Cameron McNaughton, a former air cadet, and one of the

tions.

"It's funny, I get to travel the world, but [for this project] I end up back home," laughs the laid-back surfer guy with a PhD in Oceanography from the University of Hawaii. "It's great though... I get to sleep in my own bed since I'm staying at my family's cabin on Pierce Lake, and I have my two-year-old son with me".

For the next few weeks NASA will be flying their research aircraft – a DC-8 (large commercial airplane), and a P-3 four-engine propeller (similar to Canada's P3-Aurora) – about every other day in order to collect the data.

"We've had really great support from base personnel," says Gaunce. "This is a very complex mission, and it's nice to have hosts who are supportive [and take care of us".

The team will be working out of IAMS for

NASA Scientists Conducting Research At 4 Wing

Caitlin Emond, Reporter

The scientists stepping off the DC-8 commercial aircraft last Thursday as they arrive at 4 Wing to begin their research. (Photo by Caitlin Emond)

The name of the project is Arctic Research of the Composition of the Troposphere from Aircraft and Satellites… or ARCTAS for short.

Last Thursday saw the arrival of approximately 100 NASA scientists, bringing the total number of personnel to 150. The advanced party (managers and support personnel) arrived on June 18, to begin preparations for the research project, and the entire party will be in Cold Lake until July 12.

So what, exactly, is the mission for project ARCTAS? Well, to begin…

Global warming has been on the prowl for the last century, particularly in the arctic where it has been accelerating over the last few decades. The many pollutants are transported to the arctic, including CO, Mercury and aerosols (soot and other particulate), which create an "arctic haze".

The arctic is also being affected by the "emissions from massive forest fires in boreal Eurasia and North America," making the need for research, to better understand the effects of natural versus man-made emissions on northern climate. Which is why NASA undertakes projects like ARCTAS. They have been collecting data for various projects for over a decade.

"This is a long process that can take up to several years," says Mike Gaunce, engineer, and project manager for ARCTAS. When he begins to describe how data is collected, it starts to sound a bit like a science fiction novel.

The aircraft carry remote sensing instruments that "shoot lasers up and down" in

order to map curtains of ozone concentrations. They also make measurements “in situ” (latin for ‘in the place’) by drawing air samples into the aircraft for analysis directly on board… it’s enough to make your head spin.

The scientists working on this project come from all over the world – the US, Europe, Japan, England and Canada – and they are lucky to have the opportunity to travel the world conducting research. In 2006, Gaunce was in Cape Verde, Africa, and there have been missions in Costa Rica, Chile, Sweden and Canada, just to name a few.

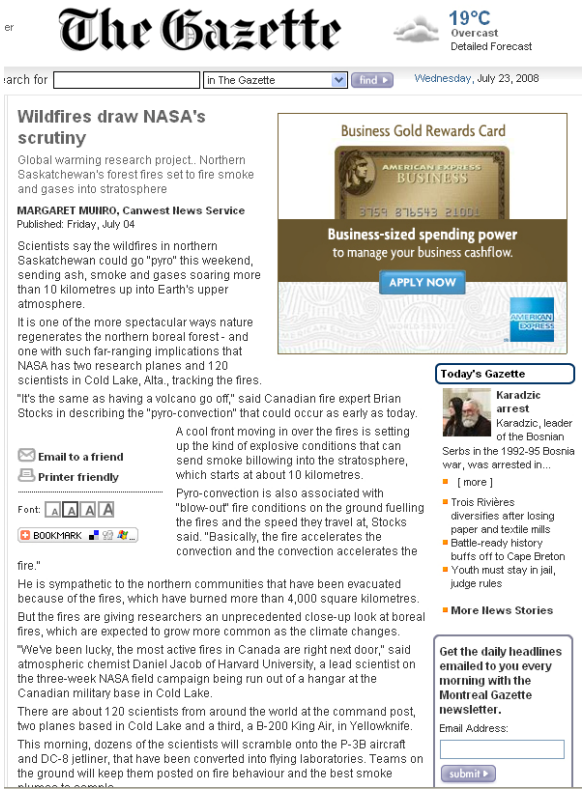
Scientist Cameron McNaughton, a former air cadet, and one of the few Canadians working on this project, is particularly happy to be in Cold Lake… his family has lived in the Meadow Lake area for three generations.

“It’s funny, I get to travel the world, but [for this project] I end up back home,” laughs the laid-back surfer guy with a PhD in Oceanography from the University of Hawaii. “It’s great though… I get to sleep in my own bed since I’m staying at my family’s cabin on Pierce Lake, and I have my two-year-old son with me”.

For the next few weeks NASA will be flying their research aircraft – a DC-8 (large commercial airplane), and a P-3 four-engine propeller (similar to Canada’s P3-Aurora) – about every other day in order to collect the data.

“We’ve had really great support from base personnel,” says Gaunce. “This is a very complex mission, and it’s nice to have hosts who are supportive and take care of us”.
The team will be working out of 1AMS for the duration of their stay at 4 Wing. For more information on the project, go to the website: http://www.espo.nasa.gov/arctas/.

4. CANWEST NEWS SERVICE
(Text picked up by Canadian media including: The Gazette, The Star Phoenix; The Province; Times Colonist; Edmonton Journal; Canada.com; Vancouver Sun; Leader Post; Calgary Herald; Windsor Star; Ottawa Citizen; Canada.com; National Post; Alaska Highway News; Dose.ca)
http://www.canada.com/montrealgazette/news/story.html?id=1a9b15c5-5ebc-450a-804f-176bc42a54aa



Fires could go 'pyro'

NASA field campaign gives scientists up-close look at Sask. Fires

Margaret Munro, Canwest News Service

Published: Friday, July 04, 2008

Scientists say wildfires in northern Saskatchewan could go "pyro" this weekend, sending ash, smoke and gases soaring more than 10 kilometres up into Earth's upper atmosphere.

It is one of the more spectacular ways nature regenerates the northern boreal forest -- and one with such far-ranging implications that NASA has two research planes and 120 scientists in Cold Lake, Alta., tracking the blazes.

"It's the same as having a volcano go off," said Canadian fire expert Brian Stocks of the "pyro-convection" that could occur as early as today.

A cool front moving in over the fires is setting up the kind of explosive conditions that can send smoke billowing into the stratosphere, which starts at about 10 kilometres.

Pyro-convection is also associated with "blow-out" fire conditions on the ground, fuelling the fires and speed they travel at, says Stocks. "Basically the fire accelerates the convection and the convection accelerates the fire."

He is sympathetic to the northern communities evacuated because of the fires, which have burned more than 4,000 square kilometres.

But the blazes are giving researchers an unprecedented close-up look at boreal fires, which are expected to grow more common as the climate changes.

"We've been lucky. The most active fires in Canada are right next door," says atmospheric chemist Daniel Jacob of Harvard University, a lead scientist on the three-week NASA field campaign being run out of a hangar at the Canadian military base in Cold Lake.

There are about 120 scientists from around the world at the command post, two planes based in Cold Lake and a third, a B-200 King Air, in Yellowknife.

This morning, dozens of the scientists at Cold Lake will scramble onto the P-3B aircraft and DC-8 jetliner, which have been converted into flying laboratories. Teams on the ground will keep them posted on fire behaviour and the best smoke plumes to sample.

"There are dozens of fires we had to choose from," said NASA's Jim Crawford, an atmospheric scientist managing the project.

Stocks, who spent more than 30 years studying fires with the Canadian Forest Service before setting up a private research firm, is helping select the largest fires with the potential to send emissions to high altitudes.

The flights are not for the faint of heart. "Daylight through the windows turned to cappuccino-coffee," one U.S. researcher reported after an "exciting" flight Wednesday. "Exiting the plume sent grandma's tin of homemade cookies into the air and all over the floor."

Crawford says the planes don't fly into "the core" of the rising fire plumes. "It's a little too turbulent and unsafe," he said in a telephone interview from Cold Lake.

They fly around the fires sampling clean air upwind and the polluted air downwind. Then they fly through the smoke at various altitudes, charting changes in concentration and the "chemical evolution" of the hydrocarbons and other compounds thrown off by the fires. The planes are also equipped with lasers that send light above and below the aircraft to probe the smoke.

The fire emissions are also tracked by satellite and by instruments carried into the atmosphere by balloons released from a network of ground stations across the country. It's part of the project called ARCTAS, short for Arctic Research of the Composition of the Troposphere from Aircraft and Satellites.

While this month's focus is on fires, earlier this year the planes were criss-crossing the north form Alaska to Greenland, sampling the pollution wafting in from Asia, Siberia, Europe and North America that contributes to Arctic haze. The $24-million, three-year mission is an international polar year project to better understand the effect fire and pollution have on the northern atmosphere and changing climate system.

BEGIN OPTIONAL TRIM

They are also "ground-truthing" the satellite systems and climate models used to monitor and forecast atmospheric conditions, which entails gathering on-site data from the places represented in the models, and confirming whether the qualities the models predict are actually happening. "The real goal is to make them better at interpreting what happens when we leave," says Crawford.

While this week's focus is on Saskatchewan fires, the scientists are also chasing smoke from blazes in California and Siberia that is wafting over Canada. And the DC-8 is expected to head for the North Pole next week to pick up the smoke from the various fires now burning.

But the excitement was building this week over the possibility of witnessing pyro-convection as the cold front moves in over the Saskatchewan fires, the biggest of which is now burning near the Manitoba/Saskatchewan border south of Reindeer Lake.

"It could send emissions from the fires to very high altitudes, where they can have an important impact on climate," says Jacob, of the possibility for pyro-convection lifting smoke into atmosphere where it could linger for months.

END OPTIONAL TRIM

While the Americans are leading ARCTAS, there is some Canadian involvement. Stocks joined the NASA project after a Canadian plan to study boreal fires as part of the polar year was rejected. And atmospheric scientist David Tarasick, of Environment Canada, was recruited by the ARCTAS team to release monitoring instruments from ground stations.

"It's too bad there is not more of a Canadian component," says Stocks. "A huge number of scientific papers are going to come out of this work and the go-to people about the impact of Canadian boreal fire on the Arctic will be from the U.S."

BEGIN OPTIONAL END

Gordon Miller, director general of Natural Resources Canada northern forest centre in Edmonton, said the department is interested in wild land fires and the implications for climate change and the Arctic but has limited resources and manpower to work with. He said a few scientists are peripherally involved in ARCTAS.

Researcher Mike Flannigan, based at a federal research centre in Sault Ste Marie, Ont., has been given $20,000 to study how much forest is consumed by the fires studied by the ARCTAS team. His group will head out after the fires are out to assess the damage. It's a "modest" contribution, says Flannigan, but important since boreal forests in the Northern Hemisphere hold an estimated one-third of the carbon found on land. And when forests burn, the carbon heads into the atmosphere as a heat-trapping greenhouse gas such as carbon dioxide.

They fly around the fires sampling clean air upwind and the polluted air downwind.

Then they fly through the smoke at various altitudes, charting changes in concentration and the "chemical evolution" of the hydrocarbons and other compounds thrown off by the fires.

The planes are equipped with lasers that send light above and below the aircraft to probe the smoke.

The fire emissions are also tracked by satellite and by instruments carried into the atmosphere by balloons released from a network of ground stations across the country. It's part of the project called ARCTAS, short for Arctic Research of the Composition of the Troposphere from Aircraft and Satellites.

While this month's focus is on fires, earlier this year the planes were criss-crossing the north from Alaska to Greenland, sampling the pollution wafting in from Asia, Siberia, Europe and North America that contributes to Arctic haze.

The $24-million, three-year mission is an international polar year project to better understand the effect fire and pollution have on the northern atmosphere and changing climate system.

They are also "ground-truthing" the satellite systems and climate models used to monitor and forecast atmospheric conditions, which entails gathering on-site data from the places represented in the models, and confirming whether the qualities the models predict are actually happening. "The real goal is to make them better at interpreting what happens when we leave," says Crawford.

While this week's focus is on Saskatchewan fires, the scientists are also chasing smoke from blazes in California and Siberia that is wafting over Canada.

And the DC-8 is expected to head for the North Pole next week to pick up the smoke from the various fires now burning.

But the excitement was building this week over the possibility of witnessing pyro-convection as the cold front moves in over the Saskatchewan fires, the biggest of which is now burning near the Manitoba/Saskatchewan border south of Reindeer Lake.

"It could send emissions from the fires to very high altitudes, where they can have an important impact on climate," says Jacob, of the possibility for pyro-convection lifting smoke into atmosphere where it could linger for months.

While the Americans are leading ARCTAS, there is some Canadian involvement.

Stocks joined the NASA project after a Canadian plan to study boreal fires as part of the polar year was rejected.

And atmospheric scientist David Tarasick, of Environment Canada, was recruited by the ARCTAS team to release monitoring instruments from ground stations.

"It's too bad there is not more of a Canadian component," says Stocks. "A huge number of scientific papers are going to come out of this work and the go-to people about the impact of Canadian boreal fire on the Arctic will be from the U.S."

Gordon Miller, director general of Natural Resources Canada's northern forest centre in Edmonton, said the department is interested in wild land fires and the implications for climate change and the Arctic but has limited resources and manpower to work with. He said a few scientists are peripherally involved in ARCTAS.

Researcher Mike Flannigan, based at a federal research centre in Sault Ste. Marie, Ont., has been given $20,000 to study how much forest is consumed by the fires studied by the ARCTAS team.

His group will head out after the fires are out to assess the damage. It's a "modest" contribution, says Flannigan, but important since boreal forests in the Northern Hemisphere hold an estimated one-third of the carbon found on land.

And when forests burn, the carbon heads into the atmosphere as a heat-trapping greenhouse gas such as carbon dioxide.

5. CBC NEWS
http://www.cbc.ca/canada/north/story/2008/07/07/nwt-nasa.html

CBCnews.ca

Home World Canada Health Arts & Entertainment Technology & Science Money Consumer Life

British Columbia Calgary Edmonton Manitoba Montreal N.B. N.L. North N.S. Ottawa P.E.I.

Story Tools: E-MAIL | PRINT | Text Size: S M L XL | REPORT TYPO | SEND YOUR FEEDBACK

NASA team lands in Yellowknife to study forest fire smoke

Last Updated: Monday, July 7, 2008 | 4:58 PM CT Comments 4 Recommend 4
CBC News

NASA scientists are in Yellowknife with lasers, airplanes and giant balloons to collect data on wildfire smoke and other air pollutants.

About a dozen scientists from the National Aeronautics and Space Administration have been in Yellowknife for the past two weeks, with some working on the ground and others flying over northern forest fires to gather information about smoke particles.

"It's going to help predict where the smoke will go, how far it gets transported around the world, and the changes in chemistry caused by the smoke in the atmosphere," Chris Hostetler, the NASA research scientist in charge of the Yellowknife mission, told CBC News in an interview.

"It's going to be ultimately used to understand the global effect of large fires like [what] we experience up here in the boreal forests in Canada."

The scientists' work is part of International Polar Year, a two-year global effort to learn more about the Arctic environment.

Last week, university students were inflating large balloons and attaching small boxes containing sensors for measuring ozone levels.

NASA also has an airplane in Yellowknife that acts as a flying laboratory with a laser radar on the bottom. Two similar planes are stationed in Cold Lake, Alta., monitoring forest fires in northern Alberta.

Hostetler said the research will help improve climate models, so that scientists can be more precise in predicting the effects of climate change in the North. His team gathered similar data in Alaska in April.

NASA does currently get a picture of northern air pollution by satellite, but Hostetler said the current work will provide more precise information.

NASA team lands in Yellowknife to study forest fire smoke

Last Updated: Monday, July 7, 2008 | 4:58 PM CT Comments*4*Recommend*4*

CBC News

NASA scientists are in Yellowknife with lasers, airplanes and giant balloons to collect data on wildfire smoke and other air pollutants.

About a dozen scientists from the National Aeronautics and Space Administration have been in Yellowknife for the past two weeks, with some working on the ground and others flying over northern forest fires to gather information about smoke particles.

"It's going to help predict where the smoke will go, how far it gets transported around the world, and the changes in chemistry caused by the smoke in the atmosphere," Chris Hostetler, the NASA research scientist in charge of the Yellowknife mission, told CBC News in an interview.

"It's going to be ultimately used to understand the global effect of large fires like [what] we experience up here in the boreal forests in Canada."

The scientists' work is part of International Polar Year, a two-year global effort to learn more about the Arctic environment.

Last week, university students were inflating large balloons and attaching small boxes containing sensors for measuring ozone levels.

NASA also has an airplane in Yellowknife that acts as a flying laboratory with a laser radar on the bottom. Two similar planes are stationed in Cold Lake, Alta., monitoring forest fires in northern Alberta.

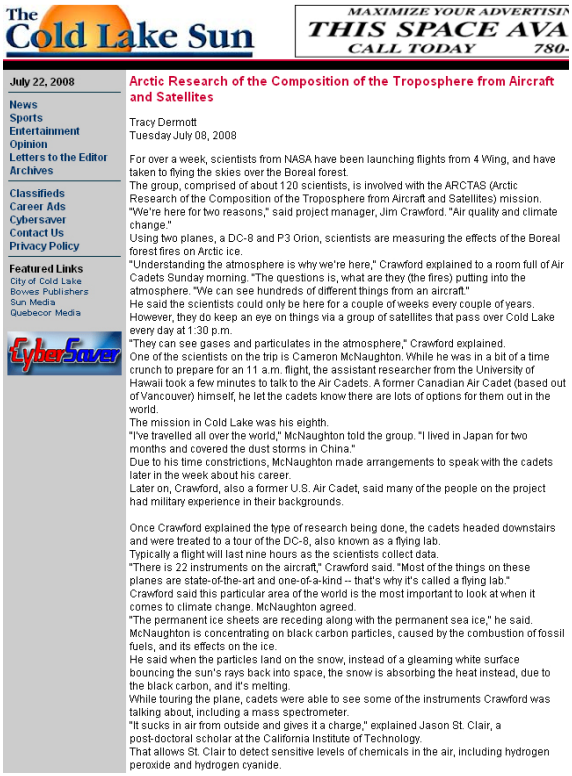
Hostetler said the research will help improve climate models, so that scientists can be more precise in predicting the effects of climate change in the North. His team gathered similar data in Alaska in April.

NASA does currently get a picture of northern air pollution by satellite, but Hostetler said the current work will provide more precise information.

"In life, you never really get to measure what you want to measure. You measure some proxy for it and use complicated mathematical algorithms to turn it into the information that you want," he said.

"So with the aircraft, we can make the measurements that we're trying to retrieve from the satellite, and validate the satellite and improve the satellite."

6. THE COLD LAKE SUN
http://cgi.bowesonline.com/pedro.php?id=14&x=story&xid=409985



The Cold Lake Sun

MAXIMIZE YOUR ADVERTISI
THIS SPACE AVA
CALL TODAY 780-

July 22, 2008

News
Sports
Entertainment
Opinion
Letters to the Editor
Archives

Classifieds
Career Ads
Cybersaver
Contact Us
Privacy Policy

Featured Links
City of Cold Lake
Bowes Publishers
Sun Media
Quebecor Media

CyberSaver

Arctic Research of the Composition of the Troposphere from Aircraft and Satellites

Tracy Dermott
Tuesday July 08, 2008

For over a week, scientists from NASA have been launching flights from 4 Wing, and have taken to flying the skies over the Boreal forest.
The group, comprised of about 120 scientists, is involved with the ARCTAS (Arctic Research of the Composition of the Troposphere from Aircraft and Satellites) mission.
"We're here for two reasons," said project manager, Jim Crawford. "Air quality and climate change."
Using two planes, a DC-8 and P3 Orion, scientists are measuring the effects of the Boreal forest fires on Arctic ice.
"Understanding the atmosphere is why we're here," Crawford explained to a room full of Air Cadets Sunday morning. "The questions is, what are they (the fires) putting into the atmosphere. "We can see hundreds of different things from an aircraft."
He said the scientists could only be here for a couple of weeks every couple of years.
However, they do keep an eye on things via a group of satellites that pass over Cold Lake every day at 1:30 p.m.
"They can see gases and particulates in the atmosphere," Crawford explained.
One of the scientists on the trip is Cameron McNaughton. While he was in a bit of a time crunch to prepare for an 11 a.m. flight, the assistant researcher from the University of Hawaii took a few minutes to talk to the Air Cadets. A former Canadian Air Cadet (based out of Vancouver) himself, he let the cadets know there are lots of options for them out in the world.
The mission in Cold Lake was his eighth.
"I've travelled all over the world," McNaughton told the group. "I lived in Japan for two months and covered the dust storms in China."
Due to his time constrictions, McNaughton made arrangements to speak with the cadets later in the week about his career.
Later on, Crawford, also a former U.S. Air Cadet, said many of the people on the project had military experience in their backgrounds.

Once Crawford explained the type of research being done, the cadets headed downstairs and were treated to a tour of the DC-8, also known as a flying lab.
Typically a flight will last nine hours as the scientists collect data.
"There is 22 instruments on the aircraft," Crawford said. "Most of the things on these planes are state-of-the-art and one-of-a-kind -- that's why it's called a flying lab."
Crawford said this particular area of the world is the most important to look at when it comes to climate change. McNaughton agreed.
"The permanent ice sheets are receding along with the permanent sea ice," he said.
McNaughton is concentrating on black carbon particles, caused by the combustion of fossil fuels, and its effects on the ice.
He said when the particles land on the snow, instead of a gleaming white surface bouncing the sun's rays back into space, the snow is absorbing the heat instead, due to the black carbon, and it's melting.
While touring the plane, cadets were able to see some of the instruments Crawford was talking about, including a mass spectrometer.
"It sucks in air from outside and gives it a charge," explained Jason St. Clair, a post-doctoral scholar at the California Institute of Technology.
That allows St. Clair to detect sensitive levels of chemicals in the air, including hydrogen peroxide and hydrogen cyanide.

Arctic Research of the Composition of the Troposphere from Aircraft and Satellites

Tracy Dermott
Tuesday July 08, 2008

For over a week, scientists from NASA have been launching flights from 4 Wing, and have taken to flying the skies over the Boreal forest.
The group, comprised of about 120 scientists, is involved with the ARCTAS (Arctic Research of the Composition of the Troposphere from Aircraft and Satellites) mission.
"We're here for two reasons," said project manager, Jim Crawford. "Air quality and climate change."
Using two planes, a DC-8 and P3 Orion, scientists are measuring the effects of the Boreal forest fires on Arctic ice.
"Understanding the atmosphere is why we're here," Crawford explained to a room full of Air Cadets Sunday morning. "The questions is, what are they (the fires) putting into the atmosphere. "We can see hundreds of different things from an aircraft."
He said the scientists could only be here for a couple of weeks every couple of years.
However, they do keep an eye on things via a group of satellites that pass over Cold Lake every day at 1:30 p.m.

"They can see gases and particulates in the atmosphere," Crawford explained.
One of the scientists on the trip is Cameron McNaughton. While he was in a bit of a time crunch to prepare for an 11 a.m. flight, the assistant researcher from the University of Hawaii took a few minutes to talk to the Air Cadets. A former Canadian Air Cadet (based out of Vancouver) himself, he let the cadets know there are lots of options for them out in the world.
The mission in Cold Lake was his eighth.
"I've travelled all over the world," McNaughton told the group. "I lived in Japan for two months and covered the dust storms in China."
Due to his time constrictions, McNaughton made arrangements to speak with the cadets later in the week about his career.
Later on, Crawford, also a former U.S. Air Cadet, said many of the people on the project had military experience in their backgrounds.
Once Crawford explained the type of research being done, the cadets headed downstairs and were treated to a tour of the DC-8, also known as a flying lab.
Typically a flight will last nine hours as the scientists collect data.
"There is 22 instruments on the aircraft," Crawford said. "Most of the things on these planes are state-of-the-art and one-of-a-kind -- that's why it's called a flying lab."
Crawford said this particular area of the world is the most important to look at when it comes to climate change. McNaughton agreed.
"The permanent ice sheets are receding along with the permanent sea ice," he said.
McNaughton is concentrating on black carbon particles, caused by the combustion of fossil fuels, and its effects on the ice.
He said when the particles land on the snow, instead of a gleaming white surface bouncing the sun's rays back into space, the snow is absorbing the heat instead, due to the black carbon, and it's melting.
While touring the plane, cadets were able to see some of the instruments Crawford was talking about, including a mass spectrometer.
"It sucks in air from outside and gives it a charge," explained Jason St. Clair, a post-doctoral scholar at the California Institute of Technology.
That allows St. Clair to detect sensitive levels of chemicals in the air, including hydrogen peroxide and hydrogen cyanide.
When asked how long it will take to analyze and release all of the information, St. Clair said the data from the mission would be finalized by October. However, papers explaining the findings wouldn't be made public until a year following that.
Back inside 1 AMS, where NASA is based out of for this experiment, Crawford explained he's been doing this kind of work for 30 years.
"It's very risky because we want to study fires," he said, pointing out you can't count on fires burning when and where you are.
"It may sound strange, but we're fortunate to have the fires burning in Saskatchewan," he said.
Crawford said Cold Lake is one of the best places to be.
"Cold Lake is one of the better deployment sites we've ever been to," he said. "It's a beautiful place."
But that's not the only reason. He said the proximity of the base to the fires is important.
"We're not spending a lot of science time flying to fires," he said, pointing out it only

takes 30 to 45 minutes for the team to get to the fires currently burning in Northern Saskatchewan.
Today (Tuesday) or tomorrow, the crew will be flying to Greenland.
"Siberia has been hot for fires this year," Crawford explained, saying the smoke has been moving up to the Arctic and making it to the snow pack there.
And then it will be back to the team's base in California -- another hot spot for fires.
Crawford said the fires there started about three days before the team left and there will be some comparison of the data they took there and the data they took here.
The group will leave Cold Lake this Saturday.

7. NEWSTALK 980 (SASKATCHEWAN, CANADA)

Mp3 available upon request