Topic 2f - Practical Products – City level apps for air quality and health

So what we do in CAMS with the model system that we have is making the most of all the information from all the scales, and using that in the best way we can to really say what the air pollution is right now and how that might change over the next few days.

But this information is becoming available to citizens in a simplified way at the moment, isn't it? There are apps you can get on your phone where you can see-- even now, you get some information about your surroundings.

Yeah, that's right. So there are a number of mobile phone apps, which take air quality monitoring data to provide a measure of what the air quality is like at a particular time in London or in different cities worldwide. And they also provide some measure of how that might change over the next few hours. And some of that is using then information which is coming from the CAMS system.

So have you got an example of that?

Yeah, so there's an example of the Plume Labs app, where they provide a measure of the quality in different locations worldwide in a simplified form that gives you some indication of what kind of activity you could plan to do that day. So if you want to go running, it will tell you whether it's going to be healthy enough for you to go running--

[CHUCKLES]

--in the air conditions, as they were.

So you've got that on your phone. So what can we see? Describe to me what's on your screen now.

Yeah, so here, it gives us a number which is related to an air quality index.

So it knows we're here. It knows where we are.

So it knows where we are. And it says we're in London. It knows the wind speed and the temperature. And it's then telling us that it's moderate air quality. And if we look outside, we've got this northerly airflow bringing fairly clean air into the city. And so it's not a very bad air quality day today.

And then this also-- it's got this line at the bottom. Tell me what that is.

So the line here at the bottom is then giving us information about how that air quality index has changed in the last few hours. But it's also then giving us a prediction of how that is

expected to change over the next 24 hours or so. And this is then based on forecast data from CAMS.

So in theory, if I was deciding whether to go running now or later, and perhaps in between the wind direction was going to change, the air quality might significantly change. And I could decide, I'm going to go now or I'm going to go later, based on model data. And that's available on phones now.

And that's available on phones now. And this is one app of several, which is using CAMS data to do exactly that.

Now, one of the important roles of CAMS is to support people out in the rest of society who want to do things, right. They want to use your data to get things done. How does that process work?

Well, it's fairly simple in a way. CAMS focuses on the global aspects. We use satellite data with forecast modeling to look at the global scale. We also have an element on regional air quality forecasts for Europe.

But there, we stop. So we go to a European scale, and that's where we stop. Then we leave it to consultancy firms, small companies, national environmental agencies, et cetera, to go to the more local scale, national scale, city scale to really provide application services that mean something for the people in respect to cities.

And the thing here is that-- I mean, you've got so much data. It's almost as though you can't use all of it yourselves, right.

Yes.

So someone else might as well have access to it.

Exactly, yes. We generate, as you say, a lot of data every day. Every day, we have forecasts with a lot of information. And we just can't do everything that can be done with it ourselves. So yes, it's a really good synergy, in a way, between what we do and then what is done on the local scale by companies, consultancy firms, et cetera.

So we've got an example of that here. There's a map. Tell me what this.

This is an application that has just been launched. It's called airText for Riga in Latvia. So again, it's a consultancy firm in Zurich that has developed this for the city of Riga to provide local air quality forecasts. So they have a very simple air quality index, a simple color skill that's intuitive to people. And you can see it on the web application, on smartphones. You can even get text messages.

So the idea here is to combine information they get from CAMS-- so the European air quality forecast we provide every day-- with their own modeling capabilities for the city specifically with emissions to get, for the city, very detailed and working with the local city council to provide a service for the citizens in Riga. So it's really nice application, going from the large scale that we do within CAMS to a very local scale in Riga.

And we can see here on the map, so we've got a map of the town divides into different regions. And then parts of it are different colors. So--

Yes.

--these are the low pollution areas, are they?

Yeah, so the more bluish, the better it is. So if you get more to the city center, you can see it become yellow. In some cases, at street level, it can even be red. So it helps people to see if they are affected where they are within the city and where they have to be more careful with their daily life.

And this app is available to people who live in Riga. But this one is just in Riga because this is built locally. This is specifically for a local purpose. And so you help with that process, and you provide the data. But they turn it into something their citizens can use?

Exactly. So all we do is support the applications they want to build and to provide a service to local citizens. In this case, they work very closely together with the city council who supports the service on the longer term. So it's free for the citizens. They can get free information on a daily basis.

And the nice thing about this is that culture varies. And so people can make whatever tool is most useful for their environment. And you've got some other examples, haven't you, of other people using your data?

Yes. So this is another, as we call, "use case," or application. So this, for the city of Bratislava, is still being in development. But the idea here is to provide tools, again, for city authorities for their planning. So they need to deal with air quality issues.

And for instance, this example shows if I have a busy road right through the city and I build a new road around a city, what would be the impact on the air quality in a city. In this case, green is good and red is bad. So you can see, you placed the air quality problem from one place to another place.

You're not removing the problem altogether. But it gives them a good tool to see what is the impact within the city and the people that actually live within the city, compared to more

outside, when you have a ring road like this.

And is this based on actual data? Or is this a model? So there was a road going through here, and then the idea is to build another road around the outside-- has this already happened, or is this just the planning process?

This is a planning process. So this is a planning tool. They use statistics of current traffic. If you would build a new road, you can estimate what the new traffic counts would be on the different roads. So they use that together with detailed emissions for the city, as well as the more background information on air quality levels that they get from CAMS.

And you can see the trade off really clearly here, can't you? Because the route through the center of the city has got better. But there's a compromise. And around the outside, it's got worse. But maybe that's not where the people are.

Exactly. And in a way, you expect this to happen. But to quantify it is of great help to people who actually have to make the decisions, because there's money involved, there's health issues involved. So if they can quantify it better with tools like these, it's really helpful to them.

And it doesn't even have to be the citizens of the place who benefit, does it? It could be people visiting that location.

Yes. It's all about making cities healthier for whoever is there-- living there or visiting.

So you've got an example that's built for tourists?

Yes. So this is an example in Greece, especially for tourists visiting Greece-- can we provide some more information about the conditions during their holidays. We're all used to look at the temperature forecasts. We go to Greece because it's warm. We want to enjoy the weather. So we look if the forecast tells us that.

But there's other things to take into account. And so this smartphone app also adds information on the UV radiation, which is important for people. Especially if you go to the beach, you want to be aware of the levels.

And then also, air quality information. If there's a smoke episode exactly during your holidays, it's not really what you're coming for, to Greece. So having this extra information helps you with better planning and better enjoying your holidays.

So in this case, Athens has built the air quality information almost into a weather app. It's all part of the same thing. You look at the weather. You look at the UV. You get the air quality.

Exactly, you combine the information. And whether we're used to air quality, now people are becoming more and more aware of the issues it can have, or the non-issues if you go to a very clean environment. So having this extra information combined with the weather information is already very good to have.

So how does it work? If a business has an idea and they say, oh, in my city, I really want to know about air pollution so that I can build an app. Do they come to you? How does that process work? They can just get access to the data, can they? But do they get help with it?

They can have access to the data. We have a user support function within CAMS and within Copernicus in general. So yes, they can come to us with their ideas and say, well, we would like to use this data. What we also do is to really encourage, especially small companies, to look at their ideas and to bring them on the market.

We have some funding available to do exactly that. So here we fund for, say, two years. Based on the ideas they have, we select the ideas we think are the most promising. They get funding for two years to develop the application to get it on the market. And then they have to be self-sustainable afterwards.

And this all works because the data is open. And it's very intuitive to understand why-- because the atmosphere is a shared resource. And so it's not like anyone owns one bit of it. So it makes sense for the data about it to be shared. But tell me a little bit about open data. Because it's a lot of data, right. You want to share it, but it's also very complicated.

Yes. So again, there is a lot of data. We start with satellite observations, which already provide enormous amounts of data. What we do in CAMS is combine information from close to 70 different satellites looking at the atmosphere in its entirety. So temperature winds, ozone, carbon monoxide, et cetera.

So we use that data together with in-situ data, so ground-based measurements, with our modeling facilities. So we have forecast models on the global scale, on the European scale, at a higher spatial resolution.

So yes, this generates enormous amounts of data because we run this a daily basis. Every day we provide a new five-day forecast for the entire globe. So people are sometimes getting lost in this amount of data. What do I do with it?

So one thing we do ourselves is provide simple graphics. This is the forecast for tomorrow in terms of carbon monoxide or NO2. But it's not where we want to stop. It's really making sure that this data is being used.

So that's where our support comes in. We provide our expertise, our user support, technical

support to help environmental agencies and countries, companies that want to use the data to make best use of it.